RESUME III

Pengaruh Nebulizer, Infra Red dan Chest Therapy terhadap Asma Bronchiale

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Abstrak

Asma Bronchial adalah penyakit inflamasi obstruktif yang ditandai oleh periode episodik spasme otot-otot polos dalam dinding saluran udara bronchial (spasme bronkus). Spasme bronkus itu menyempitkan jalan nafas, sehingga membuat pernafasan menjadi sulit dan menimbulkan bunyi mengi. Populasi penelitian ini adalah pasien penderita asma Bronchiale. Pengumpulan data didapat dari pemeriksaan Sesak Napas dengan *skala borg*. Skala Borg sebagai pemeriksaan sesak nafas. Hasil uji t menunjukkan Sig. = 0,000 (<0,05), maka Ho ditolak dan Ha diterima. Hal ini berarti sesak nafas sesudah dan sebelum tindakan nebulizer, infra red dan chest therapy tidak sama. Berdasarkan hasil analisis data dan pembahasan maka dapat disimpulkan bahwa *Nebulizer, infra red* dan *Chest Therapy* dapat mengurangi sesak nafas pada penderita *asma bronchial.*

Metode

Didalam jurnal ini peneliti menggunakan metode *Chest Therapy* diantaranya *breathing exercise* dan *postural drainage*, *tappotement*, batuk efektif yang dapat, membantu mengeluarkan *sputum*. D*iaphragmatic Breathing Exercises,* Latihan pernapasan juga diberikan dengan menggunakan tekhnik deep breathing. *Deep breathing exercise* merupakan salah satu latihan pernapasan yang banyak dikembangkan dalam kajian fisioterapi. Latihan ini bertujuan untuk meningkatkan kemampuan otot-otot pernapasan yang berguna untuk meningkatkan *compliance* paru untuk meningkatkan fungsi ventilasi dan memperbaiki oksigenasi (Smeltzer, 2008). *Nebulizer, infra red.*

Hasil

Pemeriksaan sesak napas dengan skala *Borg* pada kasus *asma bronchial* sebelum dilakukan terapi dengan sampel 8 orang, Penelitian yang dilakukan pada penderita *Asma Bronchial* di Badan Kesehatan Paru Masyarakat Semarang pada bulan desember tahun 2014, dengan 8 orang sampel, diberikan terapi latihan untuk mengatasi problematik berupa adanya sesak nafas dan spasme. Hasil pemerikasaan ditunjukkan pada Tabel 1 dan 2. Berdasarkan Tabel 3 dapat dilihat bahwa ada penurunan rata-rata sesak nafas, dari skala 4,00 menjadi 1,13. Jadi disimpulkan bahwa *Nebulizer, infra red* dan *Chest Therapy* dapat mengurangi sesak nafas pada penderita *asma bronchial.*

Kesimpulan dan saran

Berdasarkan hasil analisis data dan pembahasan maka dapat disimpulkan bahwa *Nebulizer, infra red* dan *Chest Therapy* dapat mengurangi sesak napas, pada asma *bronchiale*. Berdasarkan simpulan penelitian, disarankan beberapa hal yang berkaitan dengan pengaruh *nebulizer*, *infra red* dan *Chest Therapy* pada asma *bronchiale* :

a. Karena pentingnya kesembuhan pasien pada asma *bronchiale,* disarankan untuk melakukan latihan pernapasan sesuai dengan yang diajarkan terapis, dan menjauhi hal-hal yang menimbulkan kekambuhan.
b. b. Karena pentingnya penanganan terhadap penderita asma *bronchiale,* disarankan melakukan penelitian lanjutan untuk mengetahui pengaruh nebulizer, *infra red* dan terapi latihan.

RESUME II

PENGARUH PEMBERIAN FISIOTERAPI DADA DAN *PURSED LIPS BREATHING* (TIUPAN LIDAH) TERHADAP BERSIHAN JALAN NAFAS PADA ANAK BALITA DENGAN PNEUMONIA

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Abstrak

Pneumonia adalah infeksi parenkim paru yang sering berdampak terhadap status oksigenasi terutama bersihan jalan napas. Tujuan dari penelitian ini adalah diketahuinya pengaruh pemberian fisioterapi dada dan *pursed lips breathing* terhadap bersihan jalan napas pada anak balita dengan pneumonia di RSUD Kabupaten Indramayu. Hasil penelitian menunjukkan untuk kelompok fisioterapi dada serta kelompok fisioterapi dada dan *pursed lips breathing* menunjukkan ada pengaruh yang signifikan terhadap bersihan jalan napas dengan nilai P *value* 0,000, sedangkan untuk kelompok *pursed lips breathing* tidak ada pengaruh terhadap bersihan jalan napas dengan nilai P *value* 0, 112. Hasil penelitian ini dapat dijadikan landasan dalam memberikan asuhan keperawatan mandiri pada anak balita yang mengalami pneumonia dengan bersihan jalan nafas.

Metode

Penelitian ini merupakan penelitian kuantitatif dengan desain penelitian *Quasy Experimental pre-post test.* Rancangan penelitian yang digunakan dalam penelitian ini adalah *non equivalent without control group (non randomized without control group pretest-posttest)* dengan memberikan pengukuran bersihan jalan napas (frekuensi nafas, bunyi nafas, irama nafas, dan penggunaan otot bantu pernafasan) sebelum dan sesudah dilakukan tindakan. Populasi yang digunakan dalam penelitian ini adalah anak balita dengan pneumonia yang dirawat. Sampel yang digunakan sebanyak 30 responden yang dibagi dalam 3 kelompok intervensi. Teknik pengambilan sampel yang digunakan adalah *purposive sampling*.

Hasil

Hasil penelitian menunjukkan untuk kelompok fisioterapi dada serta kelompok fisioterapi dada dan *pursed lips breathing* menunjukkan ada pengaruh yang signifikan terhadap bersihan jalan napas dengan nilai P *value* 0,000, sedangkan untuk kelompok *pursed lips breathing* tidak ada pengaruh terhadap bersihan jalan napas dengan nilai P *value* 0, 112. Hasil penelitian ini dapat dijadikan landasan dalam memberikan asuhan keperawatan mandiri pada anak balita yang mengalami pneumonia dengan bersihan jalan nafas.

Pembahasan

Karakteristik Responden

Penelitian ini didukung oleh Hartati (2011) yang mengatakan bahwa insiden tertinggi terkena pneumonia adalah usia > 12 bulan - < 60 bulan. Bayi dan balita memiliki mekanisme pertahanan yang masih lemah dibanding orang dewasa, sehingga balita termasuk ke dalam kelompok rawan terhadap infeksi influenza dan pneumonia. Anak yang berusia 0-24 bulan lebih rentan terhadap penyakit pneumonia dibandingkan anak-anak yang berusia diatas 2 tahun. Hal ini disebabkan oleh imunitas yang belum sempurna dan saluran pernapasan yang relative sempit, sehingga bayi dan balita mudah sekali terkena penyakit pneumonia (Depkes RI, 2004).

Analisa Pengaruh Bersihan Jalan Nafas Sebelum dan Sesudah Pemberian Intervensi Fisioterapi Dada

Hasil penelitian ini membuktikan bahwa fisioterapi dada berpengaruh terhadap bersihan jalan nafas antara sebelum dan sesudah dilakukan intervensi pada balita dengan pneumonia. Fisioterapi dada mencakup 3 teknik yaitu postural *drainage*, perkusi dada dan vibrasi (Asih dan Efendy, 2004). Metode ini dapat digunakan secara berurutan pada posisi *drainage* yang berbeda dan harus diawali dengan bronchodilator (jika diprogramkan), dan dilanjutkan dengan nafas dalam dan batuk (Smeltzer & Bare, 2002).

Fisioterapi dada sangat berguna bagi penderita penyakit respirasi baik yang bersifat akut maupun kronis. Fisioterapi dada adalah salah satu fisioterapi yang menggunakan teknik postural *drainage*, perkusi dada dan vibrasi. Secara fisiologis Perkusi pada permukaan dinding akan mengirimkan gelombang berbagai amplitude dan frekuensi sehingga dapat mengubah konsistensi dan lokasi sekret (Potter & Perry, 2005).

Analisa Pengaruh Bersihan Jalan Napas Sebelum dan Sesuda eberian Intervensi PLB

Hasil uji statistik dengan menggunakan uji Cochran didapatkan bahwa nilai P*value* > α yang artinya ada perbedaan yang artinya tidak ada perbedaan yang bermakna antara bersihan jalan nafas antara sebelum dan sesudah dilakukan intervensi *pursed lips breathing* pada anak balita dengan pneumonia di RSUD Kabupaten Indramayu. Ketidaefektifan dalam penelitian ini kemungkinan dikarenakan karena usia responden yang masih balita, kadar hemoglobin, suhu tubuh, kekuatan meniup, tingkat dehidrasi, lama sakit. Seperti penelitian yang dilakukan oleh Sutini, T (2011) tentang pengaruh aktivitas bermain meniup tiupan lidah terhadap status oksigenasi pada anak usia prasekolah dengan pneumonia di RS Islam Jakarta yang didapat hasil bahwa aktivitas bermain meniup "tiupan lidah" berpengaruh terhadap status oksigenasi. PLB merupakan salah satu teknik termudah dalam mengurangi sesak napas. Teknik ini merupakan cara mudah dalam memperlambat frekuensi napas sehingga napas menjadi lebih efektif. Teknik ini dapat membantu untuk menghasilkan udara yang banyak ke dalam paru dan mengurangi energy yang dikeluarkan saat bernapas. Selain itu juga, dapat meningkatkan tekanan alveolus pada setiap lobus paru sehingga dapat meningkatkan aliran udara saat ekspirasi. Peningkatan aliran udara pada saat ekspirasi akan mengevakuasi sekret keluar dari saluran napas. tindakan ini sebagai salah satu upaya yang diduga mampu meningkatkan oksigenasi (Brunner & Sudath, 2010)

Analisa Pengaruh Bersihan Jalan Nafas Sebelum dan Sesudah Pemberian Intervensi Fisioterapi Dada dan PLB

Hasil uji statistik dengan menggunakan uji *Cochran* didapatkan bahwa nilai P*value* < α yang artinya ada perbedaan yang artinya ada perbedaan yang bermakna antara bersihan jalan nafas antara sebelum dan sesudah dilakukan intervensi fisioterapi dada dan PLB pada anak balita dengan pneumonia di RSUD Kabupaten Indramayu. Dari hasil penelitian didapatkan bahwa pada intervensi pertama belum terjadi perubahan terhadap bersihan jalan napas, tetapi pada intervensi berikutnya terjadi perubahan terhadap bersihan jalan napas dan perubahan yang sangat signifikan terjadi pada intervensi kedua (sore hari) hari kedua yaitu semua responden (10 balita) mengalami perubahan terhadap bersihan jalan napas.

Semakin lama intervensi yang dilakukan maka akan semakin terlihat perubahan terhadap bersihan jalan napas balita. Hal ini karena pada kelompok ini diberikan 2 intervensi yaitu fisioterapi dada dan PLB.

Kesimpulan

Berdasarkan hasil penelitian, maka dapat diambil kesimpulan sebagai berikut :

1. Ada perbedaan antara bersihan jalan napas sebelum dan sesudah dilakukan intervensi fisioterapi dada pada anak balita dengan pneumonia dengan p *Value* 0,000

2. Tidak ada perbedaan antara bersihan jalan napas sebelum dan sesudah dilakukan intervensi *pursed leps breathing* (tiupan lidah) pada anak balita dengan pneumonia dengan p *Value* 0,112

3. Ada perbedaan antara bersihan jalan napas sebelum dan sesudah dilakukan intervensi fisioterapi dada dan *pursed lips breathing* (tiupan lidah) pada anak balita dengan pneumonia dengan p *Value* 0,000

RESUME I

Physiotherapy management for COVID-19 in the acute hospital setting: clinical practice recommendations

Manajemen fisioterapi untuk COVID-19 di rumah sakit akut: klinis rekomendasi latihan

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Abstrak

Jurnal ini menguraikan rekomendasi untuk manajemen fisioterapi untuk COVID-19 di rumah sakit akut. Ini mencakup: rekomendasi untuk perencanaan dan persiapan tenaga kerja fisioterapi; alat skrining untuk menentukan kebutuhan fisioterapi; dan rekomendasi untuk pemilihan perawatan fisioterapi dan alat pelindung diri.

Tujuan

Jurnal ini disiapkan untuk memberikan informasi kepada fisioterapis dan fasilitas perawatan kesehatan akut tentang peran potensial fisioterapi dalam manajemen pasien yang dirawat di rumah sakit dengan con fi rmed atau dicurigai COVID-19. Fisioterapis yang bekerja di fasilitas kesehatan primer cenderung memiliki peran dalam manajemen pasien yang dirawat di rumah sakit dengan con fi rmed atau dicurigai COVID-19. Fisioterapi adalah profesi mapan di seluruh dunia. Secara global,

Metode

Panduan ini didasarkan pada pedoman praktik klinis COVID-19 terbaru dan relevan dari organisasi yang sangat dihormati, organisasi fisioterapi nasional, dan studi peer-review; sumber-sumber ini dilaporkan secara transparan. Penulis mewakili kelompok fisioterapis internasional, dengan pengalaman klinis yang luas di ICU dan bangsal.

Prinsip manajemen fisioterapi - perawatan pernapasan Contoh intervensi pernapasan yang dipimpin fisioterapi (atau fisioterapi dada) tersedia di bawah ini. Teknik pembersihan jalan nafas Teknik pembersihan jalan nafas meliputi penentuan posisi, siklus aktif pernafasan, manual dan / atau hyperin ventilator fl asi, perkusi dan getaran, terapi tekanan ekspirasi positif (PEP) dan insuf mekanis fl ation-exsuf fl asi.

Ventilasi non-invasif dan pernapasan tekanan positif inspirasi Fisioterapis dapat menggunakan pernapasan tekanan positif inspirasi (misalnya, untuk pasien dengan fraktur tulang rusuk). Ventilasi non-invasif dapat diterapkan sebagai bagian dari strategi pembersihan jalan napas dalam pengelolaan gagal napas atau selama olahraga. Teknik untuk memfasilitasi pembersihan sekresi Teknik untuk memfasilitasi pembersihan sekresi termasuk manuver batuk terbantu atau dirangsang dan penyedotan jalan napas.

Prinsip manajemen fisioterapi - mobilisasi, latihan dan intervensi rehabilitasi Fisioterapis bertanggung jawab untuk memberikan tugas rehabilitasi muskuloskeletal, neurologis, dan kardiopulmoner, seperti yang diuraikan di bawah ini.

Berbagai latihan
gerak Latihan rentang gerak sendi pasif, aktif-dibantu, aktif atau melawan dapat
dilakukan untuk mempertahankan atau meningkatkan integritas sendi, rentang gerak dan kekuatan otot.

Mobilisasi dan rehabilitasi Contoh mobilisasi dan rehabilitasi termasuk mobilitas tempat tidur, duduk dari tempat tidur, keseimbangan duduk, duduk untuk berdiri, berjalan, meja miring,

kerekan berdiri, ergometri tungkai atas / bawah dan program latihan. Kotak 4 menguraikan rekomendasi untuk menerapkan kegiatan ini pada pasien dengan COVID-19.

Pengaruh *Nebulizer, Infra Red* dan *Chest Therapy* terhadap Asma *Bronchiale*

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ABSTRAK

Asma *Bronchial* adalah penyakit *inflamasi obstruktif* yang ditandai oleh periode episodik *spasme* otot-otot polos dalam dinding saluran udara *bronchial (spasme bronkus)*. *Spasme bronkus* itu menyempitkan jalan nafas, sehingga membuat pernafasan menjadi sulit dan menimbulkan bunyi mengi. Tahun 2006, jumlah penderita asma diperkirakan mencapai 300 juta orang di dunia, angka ini diperkirakan akan terus meningkat 400 juta orang pada 2025. Rumusan masalah dalam penelitian ini adalah bagaimana pengaruh nebulizer, infra red dan chest therapy terhadap penderita *asma bronchial*. Populasi penelitian ini adalah pasien penderita asma bronchiale. Sampel penelitian ini menggunakan seluruh populasi, yaitu sebanyak 8 pasien yang secara keseluruhan diambil sebagai sampel penelitian. Pengumpulan data didapat dari pemeriksaan Sesak Napas dengan *skala borg*. Skala Borg sebagai pemeriksaan sesak nafas. Hasil uji t menunjukkan Sig. = 0,000 (<0,05), maka Ho ditolak dan Ha diterima. Hal ini berarti sesak nafas sesudah dan sebelum tindakan nebulizer, infra red dan chest therapy tidak sama. Berdasarkan hasil analisis data dan pembahasan maka dapat disimpulkan bahwa *Nebulizer, infra red* dan *Chest Therapy* dapat mengurangi sesak nafas pada penderita *asma bronchial.*

Kata Kunci: *Nebulizer, Infra red, chest therapy,* dan asma *bronchiale*

ABSTRACT

Asthma Bronchial is cronic inflammatory disease of the airways that causes periodic attacks of coughing, wheezing, shortness of breath, and chest tightness. Bronchospasm (a bronchial spasm) narrowed its breath, thus making the breathing becomes difficult and raises the sound of wheezing. In 2006, the number of asthmatics was about 300 million people in theworld, it continued to rise 400 million people in 2025. This research reports the influence of the nebulizer, infra red and chest therapy onasthma bronchial sufferers. This research population was asthmabronchial patients. The sample of this research used the entire population of patients. The overall were 8 patients. The collection of data obtained from the examination of shortness of breath with the Borg Scale. The Borg Scale examined the shortness of breath. The results showed t-test Sig. = 0.000 (< 0.05), Ho was rejected and Ha was accepted. It means that the shortness of breath after and before nebulizer, infra red and chest therapy was not the same. The results of data analysis and discussion shows that the Nebulizer, infra red and Chest Therapy can reduce shortness of breath in patients with bronchial asthma.

Kata Kunci : Nebulizer, infra red dan *Chest Therapy, and asthma bronchial*

A. PENDAHULUAN

Asma *Bronchial* adalah penyakit *inflamasi obstruktif* yang ditandai oleh periode episodik *spasme* otot-otot polos dalam dinding saluran udara *bronchial (spasme bronkus)*. *Spasme bronkus* itu menyempitkan jalan nafas, sehingga membuat pernafasan menjadi sulit dan menimbulkan bunyi mengi (Asih, 2003).

Pada penderita asma, penyempitan saluran pernapasan merupakan respon terhadap ransangan, yang pada paru normal tidak akan mempengaruhi pernafasan. Penyempitan ini dapat dipicu oleh berbagai macam ransangan, seperti serbuk sari, debu, bulu binatang, asap, udara dingin dan olahraga. Pada serangan asma, otot polos bronki mengalami kontraksi, dan jaringan yang melapisi saluran udara mengalami pembengkakan karena adanya peradangan dan pelepasan lendir yang berlebihan ke saluran udara (disebut *bronkokonstriksi)* dan penyempitan ini mengakibatkan penderita harus berusaha sekuat tenaga supaya dapat bernafas (Junaidi,2010).

Berdasarkan data Organisasi Kesehatan Dunia (WHO) tahun 2006, jumlah penderita asma diperkirakan mencapai 300 juta orang di dunia, angka ini diperkirakan akan terus meningkat 400 juta orang pada 2025. Di dunia, penyakit asma termasuk 5 besar penyebab kematian, diperkirakan 250 ribu orang kematian setiap tahunnya karena asma. Tingginya angka tersebut banyak disebabkan oleh kontrol *asma* yang buruk serta sikap pasien dan dokter yang seringkali meremehkan tingkat kontrol *asma*. Pada penderita *asma*, penyempitan saluran pernapasan merupakan respon terhadap ransangan, yang pada paru normal tidak akan mempengaruhi pernafasan. Penyempitan ini dapat dipicu oleh berbagai macam ransangan, seperti serbuk sari, debu, bulu binatang, asap, udara dingin dan olahraga. Pada serangan *asma*, otot polos *bronchi* mengalami kontraksi, dan jaringan yang melapisi saluran udara mengalami pembengkakan karena adanya peradangan dan pelepasan lendir yang berlebihan ke saluran udara (disebut *bronkokonstriksi)* dan penyempitan ini mengakibatkan penderita harus berusaha sekuat tenaga supaya dapat bernapas.

Berdasarkan sudut pandang fisioterapi, pasien *asma bronchial* menimbulkan berbagai problematik yaitu *impairment* berupa adanya sesak napas, kesulitan mengeluarkan *sputum*, dan *fungsional*

limitation meliputi gangguan aktivitas sehari-hari, dapat terhambat bila tidak segera dilakukan fisioterapi.

Nebulizer adalah alat yang digunakan untuk merubah obat dari bentuk cair ke bentuk partikel aerosol. bentuk aerosol ini sangat bermanfaat apabila dihirup atau dikumpulkan dalam organ paru. Efek dari pengobatan ini adalah untuk mengembalikan kondisi spasme bronkus (Pratyanata, 2011).

Infra Red dapat mengurangi *spasme* otot pernapasan dimana (Sujatno et al, 2003) sinar *infra red* adalah pancaran gelombang elektromagnetik dengan panjang gelombang 7700-4 juta Å, letak diantara sinar merah dan *hertzain* yang memberikan efek fisiologis dan efek terapeutik pada area yang sakit.

Pada kasus *asma bronchiale* yang mempunyai keluhan sesak napas dan sputum susah keluar, terapis akan memberikan tindakan *chest therapy* seperti latihan pernapasan *diaphragmatic breathing exercise*, deep breathing yang dapat mengurangi sesak napas, *postural drainage* dan *tappotement* yang dapat membantu mengeluarkan *sputum*.

Tujuan dari terapi latihan adalah (1) meningkatkan aktifitas penderita, (2) meningkatkan kemampuan penderita yang telah ada untuk dapat melakukan gerakan-gerakan yang berfungsi serta memiliki tujuan tertentu, sehingga dapat beraktifitas normal (Priyatna, 1985).

Dari problematik yang ditimbulkan oleh asma *bronchial*, fisioterapi memberikan modalitas yaitu *infra red* yang dapat mengurangi *spasme* otot pernapasan, sehingga otot-otot akan menjadi rileks dan terapi latihan berupa *breathing exercise* dan *postural drainage*, *tappotement*, batuk efektif yang dapat membantu mengeluarkan *sputum*.

Berdasarkan permasalahan diatas rumusan masalah dalam penelitian ini adalah bagaimana pengaruh nebulizer, infra red dan chest therapy terhadap penderita *asma bronchial*.

B. METODE PENELITIAN

Penelitian ini dilakukan di Badan Kesehatan Paru Masyarakat Semarang pada bulan desember tahun 2014. Adapun tindakan terapi pada kasus *Asma Bronchial* berupa *Chest Therapy* diantaranya *breathing exercise* dan *postural drainage*, *tappotement*, batuk efektif yang dapat membantu mengeluarkan *sputum*.

D*iaphragmatic Breathing Exercises* adalah latihan pernapasan yang dilakukan

dibagian perut atau abdominal dan tujuannya adalah untuk mengajarkan pasien menggunakan pernapasan perut. Pada penurunan sesak napas berupa otot-otot pernapasan yang bekerja lebih aktif sehingga terjadi penurunan beban kerja pernapasan. Selain itu, energi yang terbuang hanya sedikit sehingga pasien tidak akan mudah lelah (Khotimah, 2013).

Latihan pernapasan juga diberikan dengan menggunakan tekhnik deep breathing. *Deep breathing exercise* merupakan salah satu latihan pernapasan yang banyak dikembangkan dalam kajian fisioterapi. Latihan ini bertujuan untuk meningkatkan kemampuan otot-otot pernapasan yang berguna untuk meningkatkan *compliance* paru untuk meningkatkan fungsi ventilasi dan memperbaiki oksigenasi (Smeltzer, 2008).

Populasi penelitian ini adalah pasien penderita asma bronchiale. Sampel penelitian ini menggunakan seluruh populasi, yaitu sebanyak 8 orang dengan 4 jenis kelamin laki-laki dan 4 jenis kelamin perempuan. Pada sampel diberikan tindakan fisioterapi dengan modalitas nebulizer, infra red dan chest therapy.

Pengumpulan data didapat dari pemeriksaan Sesak Napas dengan *skala borg*. Skala Borg sebagai pemeriksaan sesak nafas.

P*ostural drainage* yaitu menempatkan pasien pada satu posisi tertentu yang bertujuan untuk mengalirkan *secret* dari masing-masing segmen paru-paru dengan bantuan gravitasi sehingga dapat mengalir ke *bronchus* utama. *Postural drainage* dilakukan 10-15 menit dan setiap posisi *postural drainage* berbeda-beda sesuai dengan letak sputum yang dikeluarkan. Tindakan untuk membantu mengeluarkan sputum dengan *postural drainage* bisa dikombinasikan dengan *tappotement*. *Tapotement* adalah gerakan menepuk atau memukul dan bersifat merangsang jaringan otot, dilakukan dengan kedua tangan bergantian. Untuk memperoleh hentakan yang ringan, tidak sakit pada klien tapi merangsang sesuai dengan tujuannya, maka diperlukan fleksi bilitas pergelangan tangan (Doyle, 2014).

Chest auscultation merupakan suatu proses untuk mendengarkan suara yg ditimbulkan dalam *thorax* dengan menggunakan alat bantu *Stethoscope*. Untuk mengetahui letak sputum dan bunyi napas untuk mendengarkan letak *sputum* dapat auskultasi pada lokasi *Interkosta* 2 kanan dan kiri untuk mengetahui *lobus* atas

interkosta 4 kanan dan kiri untuk mengetahui *lobus medial*, *interkosta* 8 kanan dan kiri untuk *lobus inferior* (Tim Dosen Fisioterapi, 2002).

Analisa data berupa deskriptif kuantitatif, yaitu menjelaskan data kualitatif dan data kuantitatif yang menggunakan uji t untuk membuktikan adanya pengaruh tiap-tiap variabel. Variabel terikat berupa terapi latihan (*breathing exercise* dan *postural drainage*, *tappotement*, batuk efektif yang dapat membantu mengeluarkan *sputum*), sedangkan variabel bebas berupa pemeriksaan sesak napas dan adanya *sputum*.

C. HASIL DAN PEMBAHASAN

Pemeriksaan sesak napas dengan skala *Borg* pada kasus *asma bronchial* sebelum dilakukan terapi dengan sampel 8 orang,

Tabel 1
Pemeriksaan Sesak Napas dengan Skala Borg Sebelum Tindakan Terapi (n=8)

Skala BORG	(n=8)
0 : Normal	
½ : Amat Sangat Ringan	-
1 : Sangat Ringan	-
2 : Ringan	-
3 : Sedang	2
4 : Agak Berat	4
5 : Berat	2
6 : Berat	-
7 : Sangat Berat	-
8 : Sangat Berat	-
9 : Sangat Sangat Berat	-
10 : Maksimal	-
Jumlah	**8**

Tabel 2
Hasil Pemeriksaan Sesak Napas dengan Skala Borg Sesudah Tindakan (n=8)

Skala BORG	(n=8)
0 : Normal	1
½ : Amat Sangat Ringan	2
1 : Sangat Ringan	3
2 : Ringan	1
3 : Sedang	1
4 : Agak Berat	-
5 : Berat	-
6 : Berat	-
7 : Sangat Berat	-
8 : : Sangat Berat	-
9 : Sangat Sangat Berat	-
10 : Maksimal	-
Jumlah	**8**

Tabel 3
Hasil Rata-Rata Pemeriksaan Sesak Napas dengan Skala Borg

Mean	Skala Sesak Nafas
Sebelum tindakan	4,00
Sesudah tindakan	1,13

Penelitian yang dilakukan pada penderita *Asma Bronchial* di Badan Kesehatan Paru Masyarakat Semarang pada bulan desember tahun 2014, dengan 8 orang sampel, diberikan terapi latihan untuk mengatasi problematik berupa adanya sesak nafas dan spasme. Hasil pemerikasaan ditunjukkan pada Tabel 1 dan 2. Berdasarkan Tabel 3 dapat dilihat bahwa ada penurunan rata-rata sesak nafas, dari skala 4,00 menjadi 1,13.

Tabel 4
Hasil Uji t Pemeriksaan Sesak Napas dengan Skala Borg

	t_{hitung}	Taraf signifikansi hasil hitung	Keterangan
Sebelum dan sesudah tindakan	18,348	0,000	Signifikan

Tabel 4 menunjukkan t_{hitung} = 18,348dengan Sig. = 0,000 (<0,05), maka Ho ditolak dan Ha diterima. Hal ini berarti sesak nafas sebelum dan sesudah tindakan (terapi latihan) tidak sama, yang artinya terapi latihan memberikan pengaruh terhadap sesak nafas. Pengaruh ini dapat juga dilihat pada Tabel 3 yang menunjukkan pengaruh positif berupa penurunan penurunan sesak nafas dengan *skala borg*, yaitu dari skala (sebelum tindakan) sebesar 4,00 menjadi skala (setelah tindakan) sebesar 1,13 yang berarti sesak yang dirasakan pasien sudah hilang.

Tabel 4 menunjukkan adanya pengaruh *Infra Red, Nebulizer* dan *Chest Therapy* terhadap sesak nafas pada kasus *asma brochial.*

Sputum yang sulit dikeluarkan bisa terlebih dahulu di encerkan dengan menggunakan alat *nebulizer* yang berfungsi untuk mengubah obat yang larut menjadi uap yang dapat di hirup kedalam paru-paru, sehingga obat yang masuk dapat mempermudah pengeluaran *secret* sehingga dapat pula membuat pernapasan menjadi lega. *Sputum* yang sulit dikeluarkan juga dapat dikurangi dengan pemberian *postural drainage* ditambah *tappotement*. *Postural drainage* yaitu memposisikan penderita pada berbagai posisi sesuai letak *sputum* yang bertujuan untuk mengalirkan sekresi dari masing-masing *segmen* paru dengan gaya gravitasi bertujuan dengan mengalirkan *sputum* ke lobus utama. Dapat juga dibantu dengan *tappotement* dan *vibrasi* pada saat ekspirasi, *postural drainage* dilakukan selama 15-30 menit. Pemberian nebulizer juga diberikan kepada pasien *asma bronchialee.* Penyinaran dengan menggunakan *infra red* dapat mengurangi rasa sakit/nyeri dan kekakuan pada otot. Adanya kekakuan otot-otot pernapasan dapat berkurang dengan pemberian *Infra Red*. Sinar *Infra Red* dapat memberikan efek termal pada daerah yang disinari sehingga terjadi *vasodilatasi* pembuluh darah, *vasodilatasi* pembuluh darah meningkatkan pasokan darah sehingga sisa-sisa hasil metabolisme akan terangkut, selanjutnya otot-otot akan menjadi rileks dan spasme otot berkurang (Putra, 2005).

Latihan pernapasan bertujuan untuk memperbaiki ventilasi udara, memelihara

elastisitas jaringan paru-paru dan memelihara ekspansi *thorax* agar tidak menimbulkan kecacatan lebih lanjut. Ekspansi *thorax* yang menurun dapat ditingkatkan dengan latihan mobilisasi sangkar *thorax* yang digabung dengan diberikan latihan pernapasan. Dengan latihan gerakan pada *trunk* dan anggota gerak atas yang digabungkan dengan latihan pernapasan maka secara otomatis otot-otot pernapasan yang mengalami ketegangan akan menjadi lentur dan rileks maka sistem pernapasan akan menjadi lancar dan ekspansi sangkar *thorax* akan meningkat. Pemberian rangsangan sentuhan dan penguluran akan memberikan stimulasi pada otot pernapasan untuk berkontraksi lebih kuat selama inspirasi sehingga akan menambah pengembangan sangkar *thorax* dan dapat meningkatkan volume paru. Hal ini akan memperbaiki ventilasi, meningkatkan pertukaran gas, membantu melebarkan jalan udara dan memobilisasi sangkar *thorax* sehingga ekspansi *thorax* meningkat (Watchie, 2010).

D. SIMPULAN DAN SARAN

Berdasarkan hasil analisis data dan pembahasan maka dapat disimpulkan bahwa :

Nebulizer, infra red dan *Chest Therapy* dapat mengurangi sesak napas, pada asma *bronchiale*.

Berdasarkan simpulan penelitian, disarankan beberapa hal yang berkaitan dengan pengaruh *nebulizer*, *infra red* dan *Chest Therapy* pada asma *bronchiale* :

a. Karena pentingnya kesembuhan pasien pada asma *bronchiale,* disarankan untuk melakukan latihan pernapasan sesuai dengan yang diajarkan terapis, dan menjauhi hal-hal yang menimbulkan kekambuhan.
b. Karena pentingnya penanganan terhadap penderita asma *bronchiale,* disarankan melakukan penelitian lanjutan untuk mengetahui pengaruh nebulizer, *infra red* dan terapi latihan.

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Invited Topical Review

Physiotherapy management for COVID-19 in the acute hospital setting: clinical practice recommendations

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KEY WORDS

Physical therapy
Coronavirus
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ABSTRACT

This document outlines recommendations for physiotherapy management for COVID-19 in the acute hospital setting. It includes: recommendations for physiotherapy workforce planning and preparation; a screening tool for determining requirement for physiotherapy; and recommendations for the selection of physiotherapy treatments and personal protective equipment. It is intended for use by physiotherapists and other relevant stakeholders in the acute care setting caring for adult patients with confirmed or suspected COVID-19. **[Thomas P, Baldwin C, Bissett B, Boden I, Gosselink R, Granger CL, Hodgson C, Jones AYM, Kho ME, Moses R, Ntoumenopoulos G, Parry SM, Patman S, van der Lee L (2020) Physiotherapy management for COVID-19 in the acute hospital setting: clinical practice recommendations. *Journal of Physiotherapy* 66:73–82]**

Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a new coronavirus that emerged in 2019 and causes coronavirus disease 2019 (COVID-19).[1,2] SARS-CoV-2 is highly contagious. It differs from other respiratory viruses in that it appears that human-to-human transmission occurs approximately 2 to 10 days prior to the individual becoming symptomatic.[2–4] The virus is transmitted from person to person through respiratory secretions. Large droplets from coughing, sneezing or rhinorrhoea land on surfaces within 2 m of the infected person. SARS-CoV-2 remains viable for at least 24 hours on hard surfaces and up to 8 hours on soft surfaces.[5] The virus is transferred to another person through hand contact on a contaminated surface followed by touching the mouth, nose or eyes. Aerosol airborne infected particles created during a sneeze or cough remain viable in the air for $\leq$ 3 hours.[5] These airborne particles of SARS-CoV-2 can then be inhaled by another person or land on the mucosal membranes of the eyes.

Individuals with COVID-19 can present with an influenza-like illness and respiratory tract infection demonstrating fever (89%), cough (68%), fatigue (38%), sputum production (34%) and/or shortness of breath (19%).[4] The spectrum of disease severity ranges from asymptomatic infection or mild upper respiratory tract illness through to severe viral pneumonia with respiratory failure and/or death. Current reports estimate that 80% of cases are asymptomatic or mild; 15% of cases are severe (infection requiring oxygen); and 5% are critical requiring ventilation and life support.[2]

Preliminary reports indicate that chest radiographs may have diagnostic limitations in COVID-19.[6] Clinicians need to be aware that lung computed tomography (CT) scan findings often include multiple mottling and ground-glass opacity.[7] Lung ultrasound is also being used at the bedside with findings of multi-lobar distribution of B-lines and diffuse lung consolidation.[8]

The current mortality rate is 3 to 5%, with new reports of up to 9%, which is in contrast to influenza at around 0.1%.[2] The rates of admission to an intensive care unit (ICU) are approximately 5%.[4] Around 42% of patients admitted to hospital will require oxygen therapy.[4] Based on emerging data, individuals at highest risk of developing severe COVID-19 disease requiring hospitalisation and/or ICU support are those who are older, male, have at least one

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Box 1. Physiotherapy workforce planning and preparation recommendations.

1.1	Plan for an increase in the required physiotherapy workforce. For example: • allow additional shifts for part-time staff • offer staff the ability to electively cancel leave • recruit a pool of casual staff • recruit academic and research staff, staff who have recently retired or are currently working in non-clinical roles • work different shift patterns (eg, 12-hour shifts, extended evening shifts)
1.2	Identify potential additional staff who could be deployed to areas of higher activity associated with COVID-19 admissions (eg, infectious disease ward, ICU and/or high dependency unit and other acute areas). Prioritise staff for deployment who have previous cardiorespiratory and critical care experience.
1.3	Physiotherapists are required to have specialised knowledge, skills and decision-making to work within ICU. Physiotherapists with previous ICU experience should be identified by hospitals and facilitated to return to ICU.[12]
1.4	Physiotherapists who do not have recent cardiorespiratory physiotherapy experience should be identified by hospitals and facilitated to return to support additional hospital services. For example, staff without acute hospital or ICU training may facilitate rehabilitation, discharge pathways or hospital avoidance for patients without COVID-19.
1.5	Staff with advanced ICU physiotherapy skills should be supported to screen patients with COVID-19 assigned to physiotherapy caseloads and provide junior ICU staff with appropriate supervision and support, particularly with decision-making for complex patients with COVID-19. Hospitals should identify appropriate physiotherapy clinical leaders to implement this recommendation.
1.6	Identify existing learning resources for staff who could be deployed to ICU. For example: • eLearning packages (eg, Clinical Skills Development Service for Physiotherapy and Critical Care Management)[18] • local physiotherapy staff ICU orientation • PPE training
1.7	Keep staff informed of plans. Communication is crucial to the successful delivery of safe and effective clinical services.
1.8	Staff who are judged to be at high risk should not enter the COVID-19 isolation area. When planning staffing and rosters, the following people may be at higher risk of developing more serious illness from COVID-19 and should avoid exposure to patients with COVID-19. This includes staff who: • are pregnant • have significant chronic respiratory illnesses • are immunosuppressed • are older (eg, > 60 years) • have severe chronic health conditions such as heart disease, lung disease, diabetes • have immune deficiencies, such as neutropenia, disseminated malignancy and conditions or treatments that produce immunodeficiency[12] It is recommended that staff who are pregnant avoid exposure to COVID-19. It is known that pregnant women are potentially at increased risk of complications from any respiratory disease due to the physiological changes that occur in pregnancy. There is not enough currently available information on the impact of COVID-19 on a pregnant woman or her baby.
1.9	Workforce planning should include consideration for pandemic-specific requirements such as additional workload from donning and doffing PPE, and the need to allocate staff to key non-clinical duties such as enforcing infection control procedures.[12]
1.10	Consider organising the workforce into teams that will manage COVID-19 versus non-infectious patients. Minimise or prevent movement of staff between teams. Liaise with local infection control services for recommendations.
1.11	Be aware of and comply with relevant international, national, state and/or hospital guidelines for infection control in healthcare facilities. For example, World Health Organization 'Guidelines for infection prevention and control during health care when novel coronavirus infection is suspected'.[19]
1.12	Senior physiotherapists should be involved in determining the appropriateness of physiotherapy interventions for patients with confirmed or suspected COVID-19 in consultation with senior medical staff and according to a referral guideline.
1.13	Identify hospital-wide plans for allocation/cohorting patients with COVID-19. Utilise these plans to prepare resource plans that may be required. For example, Table 2 below is an example of a resource plan for ICU physiotherapy.
1.14	Identify additional physical resources that may be required for physiotherapy interventions and how the risk of cross-infection can be minimised (eg, respiratory equipment; mobilisation, exercise and rehabilitation equipment; and equipment storage).
1.15	Identify and develop a facility inventory of respiratory, mobilisation, exercise and rehabilitation equipment and determine the process of equipment allocation as pandemic levels increase (ie, to prevent movement of equipment between infectious and non-infectious areas).
1.16	It should be recognised that staff will likely have an increased workload with a heightened risk of anxiety both at work and home.[12] Staff should be supported during and beyond the active treatment phases (eg, via access to employee assistance programs, counselling and facilitated debriefing sessions).
1.17	Consider and/or promote debriefing and psychological support; staff morale may be adversely affected due to the increased workload, anxiety over personal safety and the health of family members.[12]

COVID-19 = coronavirus disease 2019, ICU = intensive care unit, PPE = personal protective equipment.

co-existing comorbidity, higher severity of illness scores (measured via SOFA scores), elevated D-dimer levels and/or lymphocytopenia.[2,4,9–11]

Purpose

This document has been prepared to provide information to physiotherapists and acute care healthcare facilities about the potential role of physiotherapy in the management of hospital-admitted patients with confirmed or suspected COVID-19.

Physiotherapists who work in primary healthcare facilities are likely to have a role in the management of patients admitted to hospital with confirmed or suspected COVID-19. Physiotherapy is an established profession throughout the world. Globally, physiotherapists often work in acute hospital wards and ICUs. In particular, cardiorespiratory physiotherapy focuses on the management of acute and chronic respiratory conditions and aims to improve physical recovery following an acute illness. Physiotherapy may be beneficial in the respiratory treatment and physical rehabilitation of patients with COVID-19. Although a productive cough is a less common symptom (34%),[4] physiotherapy may be indicated if patients with COVID-19 present with copious airway secretions that they are unable to clear independently. This may be evaluated on a case-by-case basis and interventions applied based on clinical indicators. High-risk patients may also benefit, for example: patients with existing comorbidities that may be associated with hypersecretion or ineffective cough (eg, neuromuscular disease, respiratory disease and cystic fibrosis). Physiotherapists who practise in the ICU environment may also provide airway clearance techniques for ventilated patients

Box 2. Whom should physiotherapists treat?

2.1	The respiratory infection associated with COVID-19 is mostly associated with a dry and non-productive cough; lower respiratory tract involvement usually involves pneumonitis rather than exudative consolidation.[20] In these cases, respiratory physiotherapy interventions are not indicated.
2.2	Respiratory physiotherapy interventions in hospital wards or ICU may be indicated for patients who have confirmed or suspected COVID-19 and concurrently or subsequently develop exudative consolidation, mucous hypersecretion and/or difficulty clearing secretions.
2.3	Physiotherapists will have an ongoing role in providing interventions for mobilisation, exercise and rehabilitation (eg, in patients with comorbidities creating significant functional decline and/or (at risk of) ICU-acquired weakness).
2.4	Physiotherapy interventions should only be provided when there are clinical indicators, so that staff exposure to patients with COVID-19 is minimised. Unnecessary review of patients with COVID-19 within their isolation room/areas will also have a negative impact on PPE supplies.
2.5	Physiotherapists should meet regularly with senior medical staff to determine indications for physiotherapy review in patients with confirmed or suspected COVID-19 and screen according to set/agreed guidelines (Table 1 provides a suggested framework).
2.6	Physiotherapy staff should not be routinely entering isolation rooms, where patients with confirmed or suspected COVID-19 are isolated or cohorted, just to screen for referrals.
2.7	Options for screening patients via subjective review and basic assessment whilst not being in direct contact with the patient should be trialled first whenever possible (eg, calling the patient's isolation room telephone and conducting a subjective assessment for mobility information and/or providing education on airway clearance techniques).

COVID-19 = coronavirus disease 2019, ICU = intensive care unit, PPE = personal protective equipment.

who show signs of inadequate airway clearance and they can assist in positioning patients with severe respiratory failure associated with COVID-19, including the use of prone position to optimise oxygenation.[12]

Given the intensive medical management for some COVID-19 patients – including prolonged protective lung ventilation, sedation and use of neuromuscular blocking agents – those who are admitted to ICU may be at high risk of developing ICU-acquired weakness;[13]

Table 1
Screening guidelines for physiotherapy involvement with COVID-19.

Physiotherapy intervention	COVID-19 patient presentation (confirmed or suspected)	Physiotherapy referral
Respiratory	Mild symptoms without significant respiratory compromise (eg, fever, dry cough, no chest x-ray changes)	Physiotherapy interventions are not indicated for airway clearance or sputum samples[20] No physiotherapy contact with patient
	Pneumonia presenting with features: • a low-level oxygen requirement (eg, oxygen flow $\leq$ 5 l/min for $SpO_2 \geq 90\%$) • non-productive cough • or patient coughing and able to clear secretions independently	Physiotherapy interventions are not indicated for airway clearance or sputum samples No physiotherapy contact with patient
	Mild symptoms and/or pneumonia AND co-existing respiratory or neuromuscular comorbidity (eg, cystic fibrosis, neuromuscular disease, spinal cord injury, bronchiectasis, chronic obstructive pulmonary disease) AND current or anticipated difficulties with secretion clearance	Physiotherapy referral for airway clearance Staff use airborne precautions If not ventilated, where possible, the patient should wear a surgical mask during any physiotherapy
	Mild symptoms and/or pneumonia AND evidence of exudative consolidation with difficulty clearing or inability to clear secretions independently (eg, weak, ineffective and moist sounding cough, tactile fremitus on chest wall, wet sounding voice, audible transmitted sounds)	Physiotherapy referral for airway clearance Staff use airborne precautions If not ventilated, where possible, the patient should wear a surgical mask during any physiotherapy
	Severe symptoms suggestive of pneumonia/lower respiratory tract infection (eg, increasing oxygen requirements; fever; difficulty breathing; frequent, severe or productive coughing episodes; chest x-ray, CT or lung ultrasound changes consistent with consolidation)	Consider physiotherapy referral for airway clearance Physiotherapy may be indicated, particularly if weak cough, productive, evidence of pneumonia on imaging and/or secretion retention Staff use airborne precautions If not ventilated, where possible, the patient should wear a surgical mask during any physiotherapy Early optimisation of care and involvement of ICU is recommended
Mobilisation, exercise and rehabilitation	Any patient at significant risk of developing or with evidence of significant functional limitations • eg, patients who are frail or have multiple comorbidities impacting their independence • eg, mobilisation, exercise and rehabilitation in ICU patients with significant functional decline and/or (at risk of) ICU-acquired weakness	Physiotherapy referral Use droplet precautions Use airborne precautions if close contact required or possible aerosol generating procedures If not ventilated, where possible, the patient should wear a surgical mask during any physiotherapy

COVID-19 = coronavirus disease 2019, CT = computed tomography, ICU = intensive care unit, SpO_2 = oxyhaemoglobin saturation.

Table 2
Example of an ICU physiotherapy resource plan.

Phase	Bed capacity	Description and location of patients	Physiotherapy staffing	Equipment for respiratory care, mobilisation, exercise and rehabilitation
Business as usual	22 ICU beds and six HDU beds	All patients within existing ICU and HDU physical resources	Four FTE	• six stretcher chairs • 10 high-back sitting chairs • three rollators • one tilt table • two cycle ergometers • steps/blocks • bariatric equipment
Tier 1	Expansion with additional number of ICU beds provided (eg, opening previously non-commissioned beds)	Fewer than four patients with COVID-19 Patients with COVID-19 only allocated to beds with reverse flow isolation rooms There is limited availability of reverse flow rooms within most hospitals	Additional one FTE per four ICU beds[21] One senior physiotherapist will screen patients with COVID-19 in consultation with an ICU medical consultant Patients will be provided treatment in isolation rooms	If needed, one stretcher chair allocated and quarantined for use One tilt table quarantined for use with COVID patients. Quarantined in room, or cleaned and located for storage in isolation Additional respiratory equipment
Tier 2	Further expansion to maximum ICU capacity	The number of patients with COVID-19 exceeds the availability of isolation rooms, necessitating the care of infectious patients outside the confines of a negative pressure room Infectious patients will be cohorted on the open ward of the ICU Normal ICU admission/non-infectious patients located in a separate part of ICU	Calculation for additional FTE as above Infections ICU Pod physiotherapists allocated, including one senior physiotherapist Non-infections ICU Pod physiotherapists allocated, including one senior physiotherapist Infectious and non-infectious staff allocated, including weekends	Additional chair resources may be required Keep separate sets of chairs, tilt tables, etc, for infectious and non-infectious patients
Tier 3	Additional ICU beds created outside of ICU (eg, in anaesthetic areas)	Surge in patients with COVID-19 exceeds the capacity of the allocated infectious area Bed allocation for patients with COVID-19 allocated across the entire ICU Non-infectious satellite ICU will be established in a separate location	Calculation for additional FTE as above	Additional chair resources may be required Keep separate sets of chairs, tilt tables, etc, for infectious and non-infectious patients
Tier 4	Additional beds created across clinical areas in other parts of the hospital (eg, cardiology, operating theatres)	Large-scale emergency	Calculation for additional FTE as above	Additional chair resources may be required Keep separate sets of chairs, tilt tables, etc, for infectious and non-infectious patients

COVID-19 = coronavirus disease 2019, FTE = full-time equivalent, HDU = high dependency unit, ICU = intensive care unit.

Table 3
Specific respiratory interventions.

Aerosol-generating procedures	The following procedures create an airborne risk of transmission of COVID-19: • intubation/extubation • bronchoscopy • high-flow nasal oxygen use • non-invasive ventilation • tracheostomy • cardiopulmonary resuscitation prior to intubation[12,22] Additional aerosol-generating procedures related to physiotherapy techniques are outlined in Box 3.
High-flow nasal oxygen	This is a recommended therapy for hypoxia associated with COVID-19, as long as staff are wearing optimal airborne PPE.[12] At flow rates 40 to 60 l/min, high-flow nasal oxygen does carry a small risk of aerosol generation. The risk of airborne transmission to staff is low when optimal PPE and other infection control precautions are being used.[23] Negative pressure rooms are preferable for patients receiving high-flow nasal oxygen.[12] Respiratory support via high-flow nasal oxygen should be restricted to patients in airborne isolation rooms only. Limiting the flow rate to no more than 30 l/min might reduce potential viral transmission.
Non-invasive ventilation	Routine use is not recommended[12] because current experience with COVID-19 hypoxic respiratory failure has a high associated failure rate. If used (eg, with a patient with chronic obstructive pulmonary disease or post-extubation), it must be provided with strict airborne PPE.[12]
Oxygen therapy	Treatment targets may vary depending on the presentation of the patient. • For patients presenting with severe respiratory distress, hypoxaemia or shock, $SpO_2 > 94\%$ is targeted.[23] • Once a patient is stable, the SpO_2 target is $> 90\%$ in non-pregnant adults[24] and 92 to 95% in pregnant patients.[23] • In adults with COVID-19 and acute hypoxaemic respiratory failure, the SpO_2 target should not be maintained $> 96\%$.[22]
Nebulisation	The use of nebulised agents (eg, salbutamol, saline) for the treatment of non-intubated patients with COVID-19 is not recommended because it increases the risk of aerosolisation and transmission of infection to healthcare workers in the immediate vicinity. Use of metered-dose inhalers or spacers is preferred where possible.[12] If a nebuliser is required, liaise with local guidelines for directions to minimise aerosolisation (eg, use of a Pari Sprint with inline viral filter). Use of nebulisers, non-invasive ventilation, high-flow nasal oxygen and spirometry should be avoided and agreement to their use sought from senior medical staff.[20] If deemed essential, airborne precautions should be used.

COVID-19 = coronavirus disease 2019, FTE = full-time equivalent, HDU = high dependency unit, ICU = intensive care unit, PPE = personal protective equipment, SpO_2 = oxyhaemoglobin saturation.

this may worsen their morbidity and mortality.[14] It is therefore essential to initiate early rehabilitation after the acute phase of respiratory distress in order to limit the severity of ICU-acquired weakness and promote rapid functional recovery. Physiotherapy will have a role in providing exercise, mobilisation and rehabilitation interventions to survivors of critical illness associated with COVID-19 in order to enable a functional return to home.

Scope

This document focuses on the adult acute hospital setting. The recommendations for physiotherapists are outlined below in two sections: workforce planning and preparation, including screening to determine indications for physiotherapy; and delivery of physiotherapy interventions, including both respiratory and mobilisation/rehabilitation as well as personal protective equipment (PPE) requirements.

It is recognised that physiotherapy practices vary across the world. When using these recommendations, the scope of practice within the local context should be considered.[a]

Methods

Consensus approach

A group of international experts in cardiorespiratory physiotherapy came together to rapidly prepare clinical recommendations for physiotherapy management of COVID-19. The author group initially convened on 20 March 2020 to discuss the urgent need for worldwide acute care physiotherapy guidance in relation to COVID-19. Efforts were quickly prioritised to develop specific guidance for physiotherapists in the acute care settings.

The AGREE II framework[15] was used to guide development, and recognising the expediency of this work required pragmatic and transparent reporting. Conduct was modelled after the GRADE Adolopment Process[16] and Evidence to Decision framework[17] for recommendations and decision-making. Expertise includes ICU and acute inpatient physiotherapy (all), rehabilitation interventions in the ICU (all), physiotherapy administration (PT, IB, RG, AJ, RM, ShP), systematic reviews (PT, CB, CG, RG, CH, MK, SP, ShP, LV), guideline methodology (PT, IB, RG, CH, MK, RM, ShP, LV), and epidemiology (CH, MK).

Through a web search and personal files, recently developed guidelines for COVID-19 management of critically ill patients were identified from international agencies (eg, World Health Organization), critical care professional societies or groups (eg, Australia and New Zealand Intensive Care Society, Society of Critical Care Medicine/European Society of Intensive Care Medicine), or physiotherapy professional societies up to 21 March 2020. These guidelines were used to inform the consensus recommendations developed in conjunction with expert opinion of the authorship group.

A priori it was decided to develop consensus recommendations, given the time-sensitive nature of the guidance. It was agreed that a $\geq$ 70% agreement was required for a recommendation. On Friday 20 March 2020 the lead author (PT) circulated draft recommendations to all authors. All authors independently returned comments to the lead author. The lead author (PT) collated all comments for further discussion. All recommendations were discussed in a teleconference on 22 March 2020. Fourteen people participated in the development process and 66 recommendations were developed. A consensus of $> 70\%$ was achieved for all items. Further discussion was focused on greater clarity in wording and/or reduction of items where overlap occurred.

Endorsement for the recommendations was sought from physiotherapy societies, physiotherapy professional groups and the World Confederation for Physical Therapy. The recommendations were circulated to these groups on 23 March 2020, requesting endorsement; endorsements will be updated as they are confirmed.

Strengths and limitations

This document has several strengths. It responds to an urgent need for clinical guidance for acute care physiotherapists worldwide.

Table 4
Additional respiratory interventions in the ICU.

Intubation and mechanical ventilation	Patients with worsening hypoxia, hypercapnia, acidaemia, respiratory fatigue, haemodynamic instability or those with altered mental status should be considered for early invasive mechanical ventilation if appropriate.[12] The risk of aerosol transmission is reduced once a patient is intubated with a closed ventilator circuit.[12]
Recruitment manoeuvres	Although current evidence does not support the routine use of recruitment manoeuvres in non-COVID-19 ARDS, they could be considered in patients with COVID-19 on a case-by-case basis.[12]
Prone positioning	Anecdotal reports from international centres dealing with large numbers of critically ill patients with COVID-19-related ARDS suggest that prone ventilation is an effective strategy in mechanically ventilated patients.[12] In adult patients with COVID-19 and severe ARDS, prone ventilation for 12 to 16 hours per day is recommended.[22,23] It requires sufficient human resources and expertise to be safely performed, to prevent known complications including pressure areas and airway complications.
Bronchoscopy	Bronchoscopy carries a significant risk of aerosol generation and transmission of infection. The clinical yield is thought to be low in COVID-19 and unless there are other indications (such as suspected atypical/opportunistic superinfection or immunosuppression) it is strongly advised to avoid the procedure.[12]
Suctioning	Closed inline suction catheters are recommended.[12]
Sputum samples	In a ventilated patient, tracheal aspirate samples for diagnosis of COVID-19 are sufficient and bronchoalveolar lavage is not usually necessary.[12] Any disconnection of the patient from the ventilator should be avoided to prevent lung decruitment and aerosolisation. If necessary, the endotracheal tube should be clamped and the ventilator disabled (to prevent aerosolisation).[12]
Tracheostomy	Tracheostomy could be considered in suitable patients to facilitate nursing care and expedite ventilator weaning, but is an aerosolising procedure and this must be considered in clinical decision making.[12]

ARDS = acute respiratory distress syndrome, COVID-19 = coronavirus disease 2019, ICU = intensive care unit.

Guidance was based on the most recent and relevant COVID-19 clinical practice guidelines from highly-respected organisations, national physiotherapy organisations and peer-reviewed studies; these sources were transparently reported. The authors represent an international group of physiotherapists, with extensive clinical experience in the ICU and on the wards. They are also academic physiotherapists with experience in the leadership, conduct and execution of rigorous systematic reviews, clinical studies (including prospective cohort studies and international multi-centre trials), and clinical practice guidelines. The recommendations have been endorsed by international physiotherapy organisations.[b] Translations of the recommendations are available in Appendix 1 on the eAddenda.

There are also some limitations. Given the recent presentation of COVID-19, clinical guidance may change as more is learnt about the natural history of this disease. Recommendations were extrapolated based on best evidence for current management of critically ill patients and long-term outcomes in critical illness survivors. No patient was included in the author group. While the recommendations apply to physiotherapy interventions in the acute-care setting, longer-term follow-up of survivors is needed.

Recommendations for physiotherapy workforce planning and preparation

COVID-19 is placing significant demands on healthcare resources throughout the world. Box 1 outlines recommendations to assist the physiotherapy workforce to plan and respond to this demand. Box 2 and Table 1 provide recommendations for determining whom physiotherapists should treat when patients have confirmed or suspected COVID-19. Table 2 provides an example of a resource plan for ICU physiotherapy from Tier 0 (business as usual) through to Tier 4 (large-scale emergency). Local context, resources and expertise should be considered when utilising this example resource plan.

Medical management of COVID-19

It is important for physiotherapists to be aware of the medical management for patients with COVID-19. Table 3 summarises some of the recommendations available from medical guidelines developed by professional societies (as listed in Appendix 2 on the eAddenda).

For patients admitted to ICU, additional strategies may be used; these are summarised in Table 4. With increasing acuity, there is an increased risk of dispersion of aerosolised virus into the healthcare environment due to the nature of critical illness, higher viral load and the performance of aerosol-generating procedures. It is recommended that airborne PPE precautions should be used to care for all patients with COVID-19 in ICU.[12]

Recommendations for the delivery of physiotherapy interventions, including personal protective equipment requirements

Physiotherapy management principles – respiratory care

Examples of physiotherapy-led respiratory interventions (or chest physiotherapy) are provided below.

Airway clearance techniques

Airway clearance techniques include positioning, active cycle of breathing, manual and/or ventilator hyperinflation, percussion and vibrations, positive expiratory pressure therapy (PEP) and mechanical insufflation-exsufflation.

Non-invasive ventilation and inspiratory positive pressure breathing

Physiotherapists may use inspiratory positive pressure breathing (eg, for patients with rib fractures). Non-invasive ventilation may be applied as part of airway clearance strategies in the management of respiratory failure or during exercise.

Techniques to facilitate secretion clearance

Techniques to facilitate secretion clearance include assisted or stimulated cough manoeuvres and airway suctioning.

Other

Physiotherapists prescribe exercise and assist patients to mobilise. Physiotherapists also play an integral role in the management of patients with a tracheostomy.

COVID-19 poses significant considerations for respiratory physiotherapy interventions due to their aerosol-generating procedures. Box 3 outlines recommendations for providing respiratory care to patients with COVID-19.

Box 3. Recommendations for physiotherapy respiratory interventions.

Personal protective equipment	
3.1	It is strongly recommended that airborne precautions are utilised during respiratory physiotherapy interventions.
Cough etiquette	
3.2	Both patients and staff should practise cough etiquette and hygiene. During techniques that may provoke a cough, education should be provided to enhance cough etiquette and hygiene: • Ask the patient to cover their cough by coughing into their elbow or sleeve or into a tissue. Tissues should then be disposed and hand hygiene performed. • In addition, if possible, physiotherapists should position themselves $\geq$ 2 m from the patient and out of the likely path of dispersion.
Aerosol-generating procedures	
3.3	Many respiratory physiotherapy interventions are potentially aerosol-generating procedures. While there are insufficient investigations confirming the aerosol-generating potential of various physiotherapy interventions,[25] the combination with cough for airway clearance makes all techniques potentially aerosol-generating procedures. These include: • cough-generating procedures (eg, cough or huff during treatment) • positioning or gravity-assisted drainage techniques and manual techniques (eg, expiratory vibrations, percussion and manually assisted cough) that may trigger a cough and sputum expectoration • use of positive pressure breathing devices (eg, inspiratory positive pressure breathing), mechanical insufflation-exsufflation devices, intra/extra pulmonary high-frequency oscillation devices (eg, The Vest, MetaNeb, Percussionaire) • PEP and oscillating PEP devices • bubble PEP • nasopharyngeal or oropharyngeal suctioning • manual hyperinflation • open suction • saline instillation via an open-circuit endotracheal tube • inspiratory muscle training, particularly if used with patients who are ventilated and disconnection from a breathing circuit is required • sputum inductions • any mobilisation or therapy that may result in coughing and expectoration of mucus Therefore, there is a risk of creating an airborne transmission of COVID-19 during treatments. Physiotherapists should weigh up the risk versus benefit in completing these interventions and use airborne precautions.
3.4	Where aerosol-generating procedures are indicated and considered essential they should be undertaken in a negative-pressure room, if available, or in a single room with the door closed. Only the minimum number of required staff should be present and they must all wear PPE, as described. Entry and exit from the room should be minimised during the procedure.[12] This may not be able to be maintained when cohorting is required because of the volume of patients presenting with COVID-19.
3.5	BubblePEP is not recommended for patients with COVID-19 because of uncertainty around the potential for aerosolisation, which is similar to the caution the WHO places on bubble CPAP.[23]
3.6	There is no evidence for incentive spirometry in patients with COVID-19.
3.7	Avoid the use of mechanical insufflation/exsufflation, non-invasive ventilation, inspiratory positive pressure breathing devices or high-flow nasal oxygen devices. However, if clinically indicated and alternative options have been ineffective, consult with both senior medical staff and infection prevention and monitoring services within local facilities prior to use. If used, ensure that machines can be decontaminated after use and protect machine with viral filters over machine and patient ends of circuits: • Use disposable circuits for these devices. • Maintain a log of devices that includes patient details for tracking and infection monitoring (if required). • Use airborne precautions.
3.8	Where respiratory equipment is used, whenever possible, use single-patient-use disposable options (eg, single-patient-use PEP devices). Re-usable respiratory equipment should be avoided where possible.
3.9	Physiotherapists should not implement humidification, non-invasive ventilation or other aerosol-generating procedures without consultation and agreement with a senior doctor (eg, medical consultant).
Sputum inductions	
3.10	Sputum inductions should not be performed.
Requests for sputum samples	
3.11	In the first instance, ascertain whether the patient is productive of sputum and able to clear sputum independently. If so, physiotherapy is not required for a sputum sample. If physiotherapy interventions are required to facilitate a sputum sample, full airborne PPE should be worn. The handling of sputum samples should adhere to local policies. Generally, once a sputum sample has been obtained the following points should be followed: • All sputum specimens and request forms should be marked with a biohazard label. • The specimen should be double-bagged. The specimen should be placed in the first bag in the isolation room by a staff member wearing recommended PPE. • Specimens should be hand-delivered to the laboratory by someone who understands the nature of the specimens. Pneumatic tube systems must not be used to transport specimens.
Saline nebulisation	
3.12	Do not use saline nebulisation. It should be noted that some UK guidelines allow use of nebulisers, but this is currently not recommended in Australia.
Manual hyperinflation	
3.13	As it involves disconnection/opening of a ventilator circuit, avoid manual hyperinflation and utilise ventilator hyperinflation if indicated (eg, for suppurative presentations in ICU and if local procedures are in place).

(*Continued on next page*)

Box 3. Continued	
Positioning, including gravity-assisted drainage	
3.14	Physiotherapists can continue to advise on positioning requirements for patients.
Prone positioning	
3.15	Physiotherapists may have a role in the implementation of prone positioning in the ICU. This may include leadership within ICU 'prone teams', providing staff education on prone positioning (eg, simulation-based education sessions) or assisting in turns as part of the ICU team.
Tracheostomy management	
3.16	The presence of a tracheostomy and related procedures are potentially aerosol generating: • Cuff deflation trials and inner tube changes/cleaning can be aerosol generating. • Closed, in-line suction is recommended. • Inspiratory muscle training, speaking valves and leak speech should not be attempted until patients are over the acute infection and the risk of transmission is reduced. • Airborne precautions are recommended with infectious patients with COVID-19 with a tracheostomy.

COVID-19 = coronavirus disease 2019, CPAP = continuous positive airway pressure, ICU = intensive care unit, PEP = positive expiratory pressure, PPE = personal protective equipment, WHO = World Health Organization.

Box 4. Recommendations for physiotherapy mobilisation, exercise and rehabilitation interventions.	
Personal protective equipment	
4.1	Droplet precautions should be appropriate for the provision of mobilisation, exercise and rehabilitation in most circumstances. However, physiotherapists are likely to be in close contact with the patient (eg, for mobilisation, exercise or rehabilitation interventions that require assistance). In these cases, consider use of a high filtration mask (eg, P2/N95). Mobilisation and exercise may also result in the patient coughing or expectorating mucus, and there may be circuit disconnections with ventilated patients. Refer to local guidelines regarding ability to mobilise patients outside of their isolation room. If mobilising outside of the isolation room, ensure that the patient is wearing a surgical mask.
Screening	
4.2	Physiotherapists will actively screen and/or accept referrals for mobilisation, exercise and rehabilitation. When screening, discussion with nursing staff, the patient (eg, via phone) or family is recommended before deciding to enter the patient's isolation room. For example, to try to minimise staff who come in to contact with patients with COVID-19, physiotherapists may screen to determine an appropriate aid to trial. A trial of the aid may then be performed by the nursing staff already in an isolation room, with guidance provided, if needed, by the physiotherapist who is outside the room.
4.3	Direct physiotherapy interventions should only be considered when there are significant functional limitations, such as (risk of) ICU-acquired weakness, frailty, multiple comorbidities and advanced age.
Early mobilisation	
4.4	Early mobilisation is encouraged. Actively mobilise the patient early in the course of illness when safe to do so.[23]
4.5	Patients should be encouraged to maintain function as able within their rooms: • Sit out of bed. • Perform simple exercises and activities of daily living.
Mobilisation and exercise prescription	
4.6	Mobilisation and exercise prescription should involve careful consideration of the patient's state (eg, stable clinical presentation with stable respiratory and haemodynamic function).[26,27]
Mobility and exercise equipment	
4.7	The use of equipment should be carefully considered and discussed with local infection monitoring and prevention service staff before being used with patients with COVID-19 to ensure that it can be properly decontaminated.
4.8	Use equipment that can be single patient use. For example, use elastic resistance bands rather than distributing hand weights.
4.9	Larger equipment (eg, mobility aids, ergometers, chairs and tilt tables) must be easily decontaminated. Avoid use of specialised equipment, unless necessary, for basic functional tasks. For example, stretcher chairs or tilt tables may be deemed appropriate if they can be decontaminated with appropriate cleaning and are indicated for progression of sitting/standing.
4.10	When mobilisation, exercise or rehabilitation interventions are indicated: • Plan well. • Identify/use the minimum number of staff required to safely perform the activity.[26] • Ensure that all equipment is available and working before entering rooms. • Ensure that all equipment is appropriately cleaned or decontaminated. • If equipment needs to be shared among patients, clean and disinfect between each patient use.[23] • Specific staff training for cleaning of equipment within isolation rooms may be required. • Whenever possible, prevent the movement of equipment between infectious and non-infectious areas. • Whenever possible, keep dedicated equipment within the isolation zones, but avoid storing extraneous equipment within the patient's room.
4.11	When performing activities with ventilated patients or patients with a tracheostomy, ensure that airway security is considered and maintained (eg, a dedicated airway person to prevent inadvertent disconnection of ventilator connections/tubing).

COVID-19 = coronavirus disease 2019, ICU = intensive care unit.

Box 5. Recommendations regarding personal protective equipment for physiotherapists.

5.1	All staff must be trained in correct donning and doffing of PPE, including N95 'fit-checking'. A registry of staff who have completed PPE education and fit checking should be maintained.
5.2	'Fit testing' is recommended when available, but the evidence for fit testing effectiveness is limited and the variation in supply of N95 mask types may make any recommendation on fit testing difficult to implement from a practical perspective.[12]
5.3	Staff with beards should be encouraged to remove facial hair to ensure good mask fit.[24]
5.4	For all confirmed or suspected cases, **droplet precautions** should be implemented, at a minimum. Staff must wear the following items: • surgical mask • fluid-resistant long-sleeved gown • goggles or face shield • gloves[22]
5.5	Recommended PPE for staff caring for COVID-19-infected patients includes added precautions for patients with significant respiratory illness, when aerosol-generating procedures are likely and/or prolonged or very close contact with the patient is likely. In these cases, **airborne precautions** are followed, including: • an N95/P2 mask • fluid-resistant long-sleeved gown • goggles or face shield • gloves[24]
5.6	In addition, the following can be considered: • hair cover for aerosol-generating procedures • shoes that are impermeable to liquids and can be wiped down Recurrent use of shoe covers is not recommended, as repeated removal is likely to increase the risk of staff contamination.[12]
5.7	PPE must remain in place and be worn correctly for the duration of exposure to potentially contaminated areas. PPE (particularly masks) should not be adjusted during patient care.[24]
5.8	Use a step-by-step process for donning and doffing PPE as per local guidelines.[24]
5.9	Check local guidelines for information on laundering uniforms and/or wearing uniforms outside of work if exposed to COVID-19. For example, changing into scrubs may be recommended in local guidelines[12] and/or staff may be encouraged to get changed out of their uniform before leaving work and to transport worn uniforms home in a plastic bag for washing at home.
5.10	Minimise personal effects in the workplace. All personal items should be removed before entering clinical areas and donning PPE. This includes earrings, watches, lanyards, mobile phones, pagers, pens, etc. Stethoscope use should be minimised.[12] If required, use dedicated stethoscopes within isolation areas.[19,23] Hair should be tied back out of the face and eyes.[24]
5.11	Staff caring for infectious patients must apply correct PPE, irrespective of physical isolation. For example, in ICU, if patients are cohorted into a Pod with open rooms, staff working within the confines of the ICU Pod but not directly involved in patient care should also wear PPE. The same applies once infectious patients are nursed on an open ward. Staff then use plastic aprons, a change of gloves and hand hygiene when moving between patients in open areas.
5.12	When a unit is caring for a patient with confirmed or suspected COVID-19, it is recommended that all donning and doffing are supervised by an additional appropriately trained staff member.[12]
5.13	Avoid sharing equipment. Preferably only use single-use equipment.
5.14	Wear an additional plastic apron if a large volume of fluid exposure is expected.[24]
5.15	If reusable PPE items are used (eg, goggles), these must be cleaned and disinfected prior to re-use.[24]

COVID-19 = coronavirus disease 2019, ICU = intensive care unit, PPE = personal protective equipment.

Physiotherapy management principles – mobilisation, exercise and rehabilitation interventions

Physiotherapists are responsible for providing musculoskeletal, neurological and cardiopulmonary rehabilitation tasks, as outlined below.

Range of motion exercises

Passive, active-assisted, active or resisted joint range of motion exercises may be performed to maintain or improve joint integrity, range of motion and muscle strength.

Mobilisation and rehabilitation

Examples of mobilisation and rehabilitation include bed mobility, sitting out of bed, sitting balance, sit to stand, walking, tilt table, standing hoists, upper/lower limb ergometry and exercise programs. Box 4 outlines recommendations for implementing these activities in patients with COVID-19.

Personal protective equipment considerations

It is imperative that physiotherapists understand the measures in place to prevent transmission of COVID-19. Box 5 provides recommendations for this. Patients with confirmed or suspected COVID-19 will be managed with either droplet or airborne precautions.[12] Additionally, they will be placed in isolation. Hospitals are often able to contain patients with droplet or airborne spread within dedicated isolation rooms. However, there are a limited number of negative pressure bays and pods and/or rooms across Australia and New Zealand,[12] so isolation within dedicated rooms may not be possible with COVID-19 because of the large volume of patient admissions.

It is important for physiotherapists to understand the different types of isolation rooms that exist in hospitals. Class S rooms (standard single rooms, no negative pressure capability), which can be used for isolating patients capable of transmitting infection by droplet or contact routes[12] and Class N rooms (single negative pressure isolation rooms), which are beneficial in isolating patients with transmissible airborne infections.[12] The preference would be for patients with confirmed or suspected COVID-19 to be isolated in Class N rooms.[12] If this is not possible, Class S single rooms with clearly designated areas for donning and doffing PPE are recommended.[12] In the event of all single Class N and S rooms being fully occupied, the recommendation is for patients with COVID-19 to be separately

cohorted to patients without COVID-19 within the hospital.[12] In an open ICU or ward-cohorted areas with one or more patients with COVID-19, it is recommended that staff members in the whole area are required to use airborne PPE precautions.[12] Box 5 describes how the movement from dedicated isolation rooms to open cohorting might evolve within an ICU.

Footnotes: [a] An international team of expert researchers and clinicians within the intensive care and acute cardiorespiratory fields have developed these recommendations. The recommendations are intended for use in adults only. This document has been constructed using existing medical guidelines, relevant literature and expert opinion. The authors have made considerable effort to ensure that the information contained with the recommendation is accurate at time of publication. Further iterations of these recommendations will be published as new information arises. The information provided in this document is not designed to replace local institutional policies and should not replace clinical reasoning for individual patient management. The authors are not liable for the accuracy, information that may be perceived as misleading, or completeness of information in this document. The author group will review and update this guidance within 6 months, or if important new evidence emerges that changes the recommendations herein. [b] These recommendations have been endorsed by: Australian Physiotherapy Association, Canadian Physiotherapy Association, Association of Chartered Society of Physiotherapists in Respiratory Care UK, Associazione Riabilitatori dell' Insufficienza Respiratoria, Koninklijk Nederlands Genootschap voor Fysiotherapie, International Confederation of Cardiorespiratory Physical Therapists, World Confederation for Physical Therapy, AXXON Physical Therapy in Belgium, and Société de Kinésithérapie de Réanimation.

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PENGARUH PEMBERIAN FISIOTERAPI DADA DAN *PURSED LIPS BREATHING* (TIUPAN LIDAH) TERHADAP BERSIHAN JALAN NAFAS PADA ANAK BALITA DENGAN PNEUMONIA

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ABSTRAK

Pneumonia adalah infeksi parenkim paru yang sering berdampak terhadap status oksigenasi terutama bersihan jalan napas. Tujuan dari penelitian ini adalah diketahuinya pengaruh pemberian fisioterapi dada dan *pursed lips breathing* terhadap bersihan jalan napas pada anak balita dengan pneumonia di RSUD Kabupaten Indramayu. Penelitian ini menggunakan menggunakan *quasy experimental* dengan rancangan *non randomized without control group pretest-posttest* dengan jumlah sampel yang akan diambil sebanyak 30 responden yang dibagi dalam 3 kelompok intervensi. Teknik pengambilan data adalah *concecutive sampling*. Hasil penelitian menunjukkan untuk kelompok fisioterapi dada serta kelompok fisioterapi dada dan *pursed lips breathing* menunjukkan ada pengaruh yang signifikan terhadap bersihan jalan napas dengan nilai P *value* 0,000, sedangkan untuk kelompok *pursed lips breathing* tidak ada pengaruh terhadap bersihan jalan napas dengan nilai P *value* 0, 112. Hasil penelitian ini dapat dijadikan landasan dalam memberikan asuhan keperawatan mandiri pada anak balita yang mengalami pneumonia dengan bersihan jalan nafas.

Kata kunci : *Pneumonia, balita, fisioterapi dada, pursed lips breathing.*

PENDAHULUAN

Menurut WHO (2016) pneumonia merupakan pembunuh utama balita di dunia, lebih banyak dibandingkan dengan penyakit AIDS, malaria dan campak. Pneumonia disebut juga sebagai "pandemic yang terlupakan" atau "*the forgotten pandemic*", karena tidak banyak perhatian terhadap penyakit ini, sehingga pneumonia disebut juga pembunuh balita yang terlupakan atau "*the forgotten killer of children"*. Kemenkes RI, (2016) menyebutkan bahwa hasil *Sample Registration System* (SRS) di Indonesia tahun 2014 pneumonia merupakan penyebab kematian nomor 3 pada balita, dengan angka cakupan berkisar antara 20 – 30%, sedangkan pada tahun 2015 terjadi peningkatan menjadi 63,45%. Data Kemenkes RI, (2016) menyatakan bahwa Jawa Barat termasuk dalam 10 besar dengan jumlah kasus pneumonia terbanyak yaitu 4,62%.

Berdasarkan data Rekam Medik dan Registrasi pasien ruang perawatan anak RSUD Kabupaten Indramayu, didapatkan data pada tahun 2016 sebanyak 3.687 anak, sedangkan kasus pneumonia pada balita adalah 232 pasien dan data 2 bulan terakhir yaitu bulan Januari dan Februari 2017 jumlah kasus pneumonia pada anak balita adalah sebanyak 45 kasus dengan rincian 20 kasus pada bulan Januari dan 25 kasus pada bulan Februari 2017.

Masalah yang sering muncul pada balita dengan pneumonia yang dirawat di rumah sakit adalah *distress* pernafasan yang ditandai dengan nafas cepas, retraksi interkostal, pernafasan cuping hidung dan disertai dengan stridor (WHO, 2009). *Distress* pernafasan merupakan kompensasi tubuh terhadap kekurangan oksigen, karena konsentrasi oksigen yang rendah, akan menstimulus syaraf pusat untuk meningkatkan frekuensi pernafasan. Penurunan konsentrasi oksigen ke jaringan sering karena adanya obstruksi atau hambatan suplai oksigen ke jaringan. Pada umumnya faktor penyebab obstruksi jalan nafas atas dan bawah pada balita dengan pneumonia adalah karena peningkatan sekret sebagai salah satu manifestasi klinis adanya inflamasi pada saluran nafas (Wong, 2009).

Proses inflamasi dari penyakit pneumonia mengakibatkan produksi sekret meningkat sampai menimbulkan manifestasi klinis yang ada, sehingga muncul masalah

ketidakefektifan bersihan jalan nafas. Ketidakefektifan bersihan jalan nafas merupakan keadaan dimana individu tidak mampu mengeluarkan sekret dari saluran nafas untuk mempetahankan jalan nafas dengan karakteristik dari ketidakefektifan bersihan jalan nafas adalah batuk, dispnea, gelisah, suara nafas abnormal (*ronchi*), perubahan frekuensi nafas, penggunaan otot bantu nafas, pernafasan cuping hidung dan sputum dalam jumlah berlebihan (Herdman, 2015).

Beberapa tindakan yang efektif untuk mengatasi ketidakefektifan bersihan jalan nafas adalah dengan fisioterapi dada (*chest physiotherapy*/CPT).. Terapi CPT termasuk *postural drainage*, perkusi dan vibrasi (Potter & Perry, 2009). Fisioterapi dada sangat berguna bagi balita dengan penyakit paru baik yang bersifat akut maupun kronis, sangat efektif dalam upaya mengeluarkan sekret. Jadi tujuan pokok dari fisioterapi pada penyakit paru adalah mengembalikan dan memelihara fungsi otot – otot pernafasan dan membantu membersihkan sekret dari bronkhus dan untuk mencegah penumpukan sekret.

Intervensi lain yang dapat digunakan untuk mengatasi masalah ketidakefektifan bersihan jalan nafas selain CPT pada balita yaitu dengan teknik *pursed lips breathing* (PLB). PLB dapat meningkatkan ekspansi alveolus pada setiap lobus paru, sehingga tekanan alveolus meningkat dan dapat membantu mendorong sekret pada jalan napas saat ekspirasi dan dapat menginduksi pola napas menjadi normal (Brunner & Sudarth, 2002).

Berdasarkan hal tersebut diatas peneliti tertarik untuk melakukan penelitian tentang pengaruh pemberian fisioterapi dada dan *pursed lips breathing* (tiupan lidah) terhadap bersihan jalan napas pada anak balita dengan pneumonia di RSUD Kabupaten Indramayu.

METODE PENELITIAN

Penelitian ini merupakan penelitian kuantitatif dengan desain penelitian *Quasy Experimental pre-post test.* Rancangan penelitian yang digunakan dalam penelitian ini adalah *non equivalent without control group (non randomized without control group pretest-posttest)* dengan memberikan pengukuran bersihan jalan napas (frekuensi nafas, bunyi nafas, irama nafas, dan penggunaan otot bantu pernafasan) sebelum dan sesudah dilakukan tindakan. Populasi yang digunakan dalam penelitian ini adalah anak balita dengan pneumonia yang dirawat. Sampel yang digunakan sebanyak 30 responden yang dibagi dalam 3 kelompok intervensi. Teknik pengambilan sampel yang digunakan adalah *purposive sampling*. Penelitian ini dilaksanakan di ruang golek RSUD Kabupaten Indramayu pada bulan Mei – Juli 2017. Analisis data yang digunakan adalah *Cochran Post Hoc Mc Namer.*

HASIL PENELITIAN

1. Analisis Uji Univariat

Hasil analisis karakteristik responden pada penelitian ini menggambarkan usia responden .

Tabel 1
Distribusi Karakteristik Responden Berdasarkan Umur (n=30)

Variabel	*Mean*	*Median*	SD	Minimal – Maksimal
Umur Responden				
1. Fisioterapi dada	2.50	2.00	1.269	1-5 tahun
2. PLB	2.60	2.50	1.174	1-4 tahun
3. Fisioterapi dada & PLB	2.60	2.50	0.699	1.4 tahun

2. Analisis Uji Bivariat

1) Fisioterapi Dada

Tabel 2 Analisis Efektifitas Fisioterapi Dada Terhadap Bersihan Jalan Nafas pada Anak Balita dengan Pneumonia

No	Pengukuran Bersihan Jalan Nafas pada kelompok yang diberi Fisiotherapi dada	Bersihan Jalan Nafas		P Value
		Tdk Bersih	Bersih	
1	Sebelum intervensi 1 pagi (hari 1)	10 (100%)	0 (0%)	0,000*
	Sesudah intervensi 1 pagi (hari 1)	9 (90%)	1 (10%)	
2	Sebelum intervensi 2 sore (hari 1)	10 (100%)	0 (0%)	
	Sesudah intervensi 2 sore (hari 1)	9 (90%)	1 (10%)	
3	Sebelum intervensi 1 pagi (hari 2)	10 (100%)	0 (0%)	
	Sesudah intervensi 1 pagi (hari 2)	4 (40%)	6 (60%)	
4	Sebelum intervensi 2 sore (hari 2)	3 (30%)	7 (70%)	
	Sesudah intervensi 2 sore (hari 2)	1 (10%)	9 (90%)	

Ket: * Uji *Cochran*

Tabel 3 Analisis Efektifitas Fisiotherapi Dada terhadap Bersihan Jalan Nafas antara Fisioterapi Dada Pre 1 dengan Post 2, 4, 6 dan 8 pada Anak Balita dengan Pneumonia

No	Pengukuran	Bersihan Jalan Napas		P Value
		Tdk Bersih	Bersih	
1	Pengukuran sebelum intervensi hari pertama dan sesudah intervensi hari pertama (pagi)	9 (90%)	1 (10%)	1,000*
2	Pengukuran pagi hari sebelum intervensi hari pertama dan sesudah intervensi hari pertama (sore)	9 (90%)	1 (10%)	1.000*
3	Pengukuran pagi hari sebelum intervensi dan sesudah intervensi hari kedua (pagi)	4 (40%)	6 (60%)	0,031*
4	Pengukuran pagi hari sebelum intervensi dan sesudah intervensi hari kedua (sore)	1 (10%)	9 (90%)	0,004*

Ket: * Uji *Mc Nemar*

2) Pursed Lips Breathing

Tabel 4 Analisis Efektifitas PLB terhadap Bersihan Jalan Nafas pada Anak Balita dengan Pneumonia

No	Pengukuran Bersihan Jalan Nafas pada kelompok yang diberi PLB	Bersihan Jalan Nafas		P Value
		Tdk Bersih	Bersih	
1	Sebelum intervensi (hari 1)	10 (100%)	0 (0,0)	0,112*
2	Sesudah intervensi (hari 1)	10 (100%)	0 (0,0)	
3	Sebelum intervensi (hari 2)	8 (80%)	2 (20%)	
4	Sesudah intervensi (hari 2)	8 (80%)	2 (20%)	

Ket: * Uji *Cochran*

Tabel 5 Analisis Efektifitas PLB terhadap Bersihan Jalan Nafas antara PLB Pre 1 dengan Post 2 dan 4 pada Anak Balita dengan Pneumonia

No	Pengukuran	Bersihan Jalan Napas		P Value
		Tidak Bersih	Bersih	
1	Pengukuran hari intervensi hari sebelum	10 (100%)	0 (0%)	1,000*

No	Pengukuran	Bersihan Jalan Napas		P Value
		Tidak Bersih	Bersih	
	intervensi hari pertama dan sesudah intervensi hari pertama			
2	Pengukuran hari sebelum intervensi hari pertama dan sesudah kedua	8 (80%)	2 (20%)	0,500*

Ket: * Uji *Mc Nemar*

1. Fisioterapi Dada dan PLB

Tabel 6 Analisis Efektifitas Fisiotherapi Dada dan PLB Terhadap Bersihan Jalan Nafas pada Anak Balita dengan Pneumonia

No	Pengukuran Bersihan Jalan Nafas pada kelompok yang diberi Fisiotherapi Dada & PLB	Bersihan Jalan Nafas		P Value
		Tdk Bersih	Bersih	
1	Sebelum intervensi 1 pagi (hari 1)	10 (10%)	0 (0%)	0,000*
2	Sesudah intervensi 1 pagi (hari 1)	8 (80%)	2 (20%)	
3	Sebelum intervensi 2 sore (hari 1)	10 (100%)	0 (0%)	
4	Sesudah intervensi 2 sore (hari 1)	7 (70%)	3 (30%)	
5	Sebelum intervensi 1 pagi (hari 2)	7 (70%)	3 (30%)	
6	Sesudah intervensi 1 pagi (hari 2)	3 (30%)	7 (70%)	
7	Sebelum intervensi 2 sore (hari 2)	2 (20%)	8 (80%)	
8	Sesudah intervensi 2 sore (hari 2)	0 (0%)	10 (100%)	

Ket: * Uji *Cochran*

Tabel 7 Analisis Efektifitas Fisiotherapi Dada dan *Pursed Lips Breathing* terhadap Bersihan Jalan Nafas antara Fisiotherapi Dada dan *Pursed Lips Breathing* Pre 1 dengan Post 2, 4, 6 dan 8 pada Anak Balita dengan Pneumonia

No	Pengukuran	Bersihan Jalan Napas		P Value
		Tidak Bersih	Bersih	
1	Pengukuran pagi hari sebelum intervensi hari pertama dan sesudah intervensi hari pertama pagi	8 (80%)	2 (20%)	0,500
2	Pengukuran pagi hari sebelum intervensi hari pertama dan sesudah intervensi hari pertama sore	7 (70%)	3 (30%)	0.250
3	Pengukuran pagi hari sebelum intervensi hari kedua dan sesudah intervensi hari kedua pagi	3 (30%)	7 (70%)	0,016
4	Pengukuran pagi hari sebelum intervensi hari kedua dan sesudah intervensi hari kedua sore	0 (0%)	10 (100%)	0,002

Ket: * Uji *Mc Nemar*

PEMBAHASAN

1. Karakteristik Responden

Rata-rata usia anak pada kelompok fisioterapi dada adalah 2.50 tahun dengan usia termuda adalah 1 tahun dan usia tertua 5 tahun. Untuk kelompok PLB rata-rata usia anak adalah 2.60 tahun dengan usia termuda 1 tahun dan usia tertua 4 tahun. Sedangan untuk kelompok fisioterapi dada dan PLB rata-rata 2.60 tahun dengan usia termuda 1 tahun dan usia tertua 4 tahun.

Penelitian ini didukung oleh Hartati (2011) yang mengatakan bahwa insiden tertinggi terkena pneumonia adalah usia > 12 bulan - < 60 bulan. Bayi dan balita memiliki mekanisme pertahanan yang masih lemah dibanding orang dewasa, sehingga balita termasuk ke dalam kelompok rawan terhadap infeksi influenza dan pneumonia. Anak yang berusia 0-24 bulan lebih rentan terhadap penyakit pneumonia dibandingkan anak-anak yang berusia diatas 2 tahun. Hal ini disebabkan oleh imunitas yang belum sempurna dan saluran pernapasan yang relatif sempit, sehingga bayi dan balita mudah sekali terkena penyakit pneumonia (Depkes RI, 2004).

2. Analisa Pengaruh Bersihan Jalan Nafas Sebelum dan Sesudah Pemberian Intervensi Fisioterapi Dada

Hasil uji statistik dengan menggunakan uji *Cochran* didapatkan bahwa nilai P*value* < α yang artinya ada perbedaan yang bermakna antara bersihan jalan nafas antara sebelum dan sesudah dilakukan intervensi fisioterapi dada pada anak balita dengan pneumonia. Dari hasil penelitian didapatkan bahwa pada intervensi pertama belum terjadi perubahan terhadap bersihan jalan napas, tetapi pada intervensi berikutnya terjadi perubahan terhadap bersihan jalan napas dan perubahan yang sangat signikan terjadi pada intervensi kedua (sore hari) hari kedua. Semakin lama intervensi yang dilakukan maka akan semakin terlihat perubahan terhadap bersihan jalan napas balita.

Hasil penelitian ini membuktikan bahwa fisioterapi dada berpengaruh terhadap bersihan jalan nafas antara sebelum dan sesudah dilakukan intervensi pada balita dengan pneumonia. Fisioterapi dada mencakup 3 teknik yaitu postural *drainage*, perkusi dada dan vibrasi (Asih dan Efendy, 2004). Metode ini dapat digunakan secara berurutan pada posisi *drainage* yang berbeda dan harus diawali dengan bronchodilator (jika diprogramkan), dan dilanjutkan dengan nafas dalam dan batuk (Smeltzer & Bare, 2002).

Fisioterapi dada sangat berguna bagi penderita penyakit respirasi baik yang bersifat akut maupun kronis. Fisioterapi dada adalah salah satu fisioterapi yang menggunakan teknik postural *drainage*, perkusi dada dan vibrasi. Secara fisiologis Perkusi pada permukaan dinding akan mengirimkan gelombang berbagai amplitude dan frekuensi sehingga dapat mengubah konsistensi dan lokasi sekret (Potter & Perry, 2005). Menurut Smeltzer & Bare (2002) vibrasi yang dilakukan setelah perkusi meningkatkan turbulensi udara ekspirasi sehingga dapat melepaskan mukus kental yang melekat pada bronkhus dan bronkiolus, sehingga postural *drainage* merupakan salah satu intervensi untuk melepaskan sekresi dai berbagai segmen paru – paru dengan menggunakan pengaruh gaya gravitasi. Postural *drainage* menggunakan posisi khusus yang meningkatkan gaya gravitasi membantu mengeluarkan sekresi bronkhial.

Penelitian lain yang dilakukan oleh Hussein (2011) di Cairo University yang bertujuan untuk mengetahui efek fisioterapi dada terhadap bersihan jalan napas anak yang mengalami pneumonia. Penelitian dilakukan pada dua kelompok yaitu kelompok kontrol (30 responden) dan kelompok intervensi (30 responden). Hasil penelitian didapatkan bahwa fisioterapi dada efekif dalam meningkatkan bersihan saluran udara dengan anak yang mengalami pneumonia yang dievaluasi dari penurunan kebutuhan oksigen dan frekuensi penyedotan (*suction*), hasil uji statistik penelitian ini menunjukkan ada perbedaan bermakna degan P = 0,000 .

Pada usia anak semua organ tubuh terus berkembang sampai mencapai fungsi yang sempurna, termasuk sistem pernapasan dan sistem kardiovaskuler yang mempunyai peranan penting dalam pengaturan status oksigenasi. Alveoli berkembang baik ukuran, bentuk maupun jumlahnya sehingga saluran pernapasan menjadi sempurna, hal ini dapat dicapai pada anak usia 12 tahun. Permukaan alveolar yang bertambah luas berguna untuk pertukaran gas. Pertumbuhan anak berhubunga erat dengan peningkatan percabangan dari bronkiolus perifer dan jumlah alveoli. Semakin anak bertambah tinggi, maka semakin besar dan luas permukaan paru-paru. Pada balita yang mengalami gangguan bersihan jalan napas terjadi penumpukan sekret, sekret akan lepas dari saluran pernapasan dan akhirnya dapat keluar melalui mulut dengan adanya proses batuk pada saat dilakukan fisioterapi dada. Menurut Lubis (2005), fisioterapi dada sangat efektif dalam mengeluarkan sekret dan memperbaiki ventilasi pada pasien dengan fungsi paru yang terganggu. Tujuan pokok fisioterapi dada pada penyakit paru adalah mengembalikan dan memelihara fungsi otot-otot pernapasan dan membantu membersihkan sekret dari bronkhus dan mencegah penumpukan sekret.

3. Analisa Pengaruh Bersihan Jalan Napas Sebelum dan Sesuda eberian Intervensi PLB

Hasil uji statistik dengan menggunakan uji Cochran didapatkan bahwa nilai P*value* > α yang artinya tidak ada perbedaan yang bermakna antara bersihan jalan nafas antara sebelum dan sesudah

dilakukan intervensi *pursed lips breathing* pada anak balita dengan pneumonia di RSUD Kabupaten Indramayu.

Ketidaefektifan dalam penelitian ini kemungkinan dikarenakan karena usia responden yang masih balita, kadar hemoglobin, suhu tubuh, kekuatan meniup, tingkat dehidrasi, lama sakit. Seperti penelitian yang dilakukan oleh Sutini, T (2011) tentang pengaruh aktivitas bermain meniup tiupan lidah terhadap status oksigenasi pada anak usia prasekolah dengan pneumonia di RS Islam Jakarta yang didapat hasil bahwa aktivitas bermain meniup "tiupan lidah" berpengaruh terhadap status oksigenasi.

PLB merupakan salah satu teknik termudah dalam mengurangi sesak napas. Teknik ini merupakan cara mudah dalam memperlambat frekuensi napas sehingga napas menjadi lebih efektif. Teknik ini dapat membantu untuk menghasilkan udara yang banyak ke dalam paru dan mengurangi energi yang dikeluarkan saat bernapas. Selain itu juga, dapat meningkatkan tekanan alveolus pada setiap lobus paru sehingga dapat meningkatkan aliran udara saat ekspirasi. Peningkatan aliran udara pada saat ekspirasi akan mengevakuasi sekret keluar dari saluran napas. tindakan ini sebagai salah satu upaya yang diduga mampu meningkatkan oksigenasi (Brunner & Sudath, 2010) karena memberikan efek yang baik terhadap pernapasan, diantaranya adalah (a) meningkatkan ventilasi, (b) membebaskan udara yang terperangkap dalam paru–paru, (c) menjaga napas tetap terbuka lebih lama dan mengurangi kerja napas, (d) memperpanjang waktu ekshalasi yang kemudian memperlambat frekuensi napas, (e) meningkatkan pola napas dengan mengeluarkan udara 'lama" dan memasukkan udara 'baru' ke dalam paru, (f) menghilangkan sesak napas dan (g) meningkat relaksasi.

Menurut Brunner & Suddarth (2008) inspirasi yang adekuat dapat meningkatkan volume dan tekanan alveoli sehingga dapat meningkatkan tekanan aliran udara saat inspirasi. Peningkatan tekanan aliran udara ekspirasi dapat menggerakan silia-silia saluran napas yang berguna untuk mengeluarkan benda asing yang ada didalamnya, termasuk secret. Semakin kuat meniup semakin kuat pula silia bergerak untuk mendorong benda asing atau secret keluar dari jalan napas sehingga pada akhirnya dapat memberikan dampak positif terhadap perubahan status oksigenasi (Sutini, 2011).

Penelitian lain yang dilakukan oleh Enright, Chatam & Ionescu (2004) di Australia pada pasien PPOK yang tidak di rawat di rumah sakit, menghasilkan pengingkatan fungsi faal paru rata-rata sebesar 60% setelah latihan PLB dan latihan otot-otot pernapasan selama 8 minggu, sedangkan pada pasien yang tidak dilakukan teknik ini rata-rata hanya meningkat 10%.

Penelitian lain yang dilakukan oleh *Division of Physiotherapi* (2003) di rumah sakit Karolinska University Swedia pada tahun 2003 pada pasien PPOK berjumlah 32 pasien yang dirawat di rumah sakit. dihasilkan fungsi faal paru rata-rata 90% setelah latihan PLB selama 1 minggu.

PLB menimbulkan obstruksi terhadap aliran udara ekshalasi dan meningkatkan tekanan udara, menurunkan gradient tekanan transmural dan mempertahankan kepatenan jalan napas yang kolaps selama ekshalasi. Proses ini membantu menurunkan pengeluaram udara yang terjebak, tidak secara langsung menurunkan kapasitas fungsional residu, tetapi perbaikan sesak napas merupakan akibat restorasi diafragma terhadap posisi thoraks yang mengalami

4. Analisa Pengaruh Bersihan Jalan Nafas Sebelum dan Sesudah Pemberian Intervensi Fisioterapi Dada dan PLB

Hasil uji statistik dengan menggunakan uji *Cochran* didapatkan bahwa nilai P*value* < α yang artinya ada perbedaan yang bermakna antara bersihan jalan nafas antara sebelum dan sesudah dilakukan intervensi fisioterapi dada dan PLB pada anak balita dengan pneumonia di RSUD Kabupaten Indramayu. Dari hasil penelitian didapatkan bahwa pada intervensi pertama belum terjadi perubahan terhadap bersihan jalan napas, tetapi pada intervensi berikutnya terjadi perubahan terhadap bersihan jalan napas dan perubahan yang sangat signifikan terjadi pada intervensi kedua (sore hari) hari kedua yaitu semua responden (10 balita) mengalami perubahan terhadap bersihan jalan napas. Semakin lama intervensi yang dilakukan maka akan semakin terlihat perubahan terhadap bersihan jalan napas balita. Hal ini

karena pada kelompok ini diberikan 2 intervensi yaitu fisioterapi dada dan PLB.

Perbedaan pada penelitian ini dengan peneltian sebelumnya yaitu pada penelitian ini menggabungkan kedua intervensi yang diberikan yaitu fisioterapi dada dan PLB terhadap bersihan jalan napas pada anak balita dengan pneumonia dan hasilnya sangat terbuki efektif jika dilakukan secara bersama-sama untuk bersihan jalan napas pada anak balita dengan pneumonia.

PENUTUP

1. Kesimpulan

Berdasarkan hasil penelitian, maka dapat diambil kesimpulan sebagai berikut :

1. Ada perbedaan antara bersihan jalan napas sebelum dan sesudah dilakukan intervensi fisioterapi dada pada anak balita dengan pneumonia dengan p *Value* 0,000
2. Tidak ada perbedaan antara bersihan jalan napas sebelum dan sesudah dilakukan intervensi *pursed leps breathing* (tiupan lidah) pada anak balita dengan pneumonia dengan p *Value* 0,112
3. Ada perbedaan antara bersihan jalan napas sebelum dan sesudah dilakukan intervensi fisioterapi dada dan *pursed lips breathing* (tiupan lidah) pada anak balita dengan pneumonia dengan p *Value* 0,000

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