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Pengaruh pelatihan kader yandu lansia dalam menciptakan desa ramah dan sehat bagi lansia di Desa Purwobinangun, Sleman

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ABSTRAK Erupsi Gunung Merapi merupakan bencana alam yang mengakibatkan trauma psikologis bagi lansia. Lansia berisiko mengalami depresi, disabilitas dan menurunkan kualitas hidup sehingga perlu dilakukan penanganan terkait kesehatan dan kualitas hidup lansia yaitu dengan memberikan pendampingan yang berkelanjutan pada kader yandu lansia dalam menciptakan desa ramah dan sehat lansia. Tujuan penelitian ini adalah mengetahui pengaruh peningkatan pengetahuan dan keterampilan kader yandu lansia dalam menciptakan desa ramah dan sehat bagi lansia di Desa Purwobinangun, Sleman. Penelitian ini menggunakan data sekunder dari pengabdian masyarakat pada bulan Mei sampai September 2018 di Desa Purwobinangun, Sleman. Sasaran pengabdian masyarakat tersebut adalah 53 kader yandu lansia dan 80 lansia di Desa Purwobinangun, Sleman. Instrumen yang digunakan adalah modul peningkatan kapasitas kader untuk desa ramah dan sehat lansia, *geriatric deppression scale* (GDS), *mini mental state examination* (MMSE), kuesioner pengetahuan dan keterampilan permainan lokal, deteksi dini dan penanggulangan kesehatan lansia. Data disajikan secara deskriptif kuantitatif. Setelah diberikan pelatihan, nilai rata-rata pengetahuan penanggulangan permainan kearifan budaya lokal, dukungan sosial dan religius, senam otak, dan ramah lansia meningkat sebanyak 30 poin, 50 poin, 40 poin, dan 50 poin berturut-turut. Perubahan nilai rata-rata keterampilan kader yandu lansia dalam penanggulangan permainan kearifan budaya lokal, dukungan sosial dan religius, senam otak, dan ramah lansia meningkat sebanyak 17,12 poin, 19,18 poin, 28,68 poin, dan 27,58 poin. Untuk perubahan kecenderungan gangguan kesehatan, lansia yang tidak hipertensi meningkat sebanyak 7 orang, untuk lansia yang mengalami diabetes melitus tidak ada perubahan jumlah sebelum dan setelah pelatihan, sedangkan lansia yang mengalami depresi turun sebanyak 18 orang. Untuk lansia yang mengalami gangguan kognitif turun sebanyak 18 orang dan lansia yang memiliki kualitas hidup tinggi meningkat sebesar 22 lansia. Pelatihan yandu lansia dapat meningkatkan pengetahuan dan keterampilan kader yandu lansia dalam penangulangan gangguan kesehatan pada lansia.

KATA KUNCI depresi; dukungan sosial; kualitas hidup; lansia; permainan lokal

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ABSTRACT *Merapi eruption can cause a psychological traumatic for elderly such as depression, increase disability, and decrease quality of life. We need to train the cadres to make an elderly care village. The aim of this study is to know the influence of cadre training in knowledge and skill for elderly healthiness. This study uses secondary data from community research on May until September 2018 in Desa Purwobinangun, Sleman. The target is cadres and 80 elderlies in Desa Purwobinangun, Sleman. The instruments in this study such as Module Ramah dan Sehat Lansia, Geriatric Depression Scale (GDS), Mini Mental State Examination (MMSE), questionnaire about knowledge and skills of a traditional games, and questionnaire about early detection and treatment in old age health. The data will be shown in quantitative data. After trained, the average value of the knowledge of coping with local cultural wisdom games, social and religious support, brain gymnastics, and friendly elderly increased by 30 points, 50 points, 40 points, and 50 points respectively. Changes in the average value of the skills of elderly yandu cadres in tackling local cultural wisdom games, social and religious support, brain gymnastics, and friendly elderly have increased by 17.12 points, 19.18 points, 28.68 points, and 27.58 points. For changes in the trend of health problems, the elderly who are not hypertensive increased by 7 people, for the elderly who have diabetes mellitus there was no change in the number before and after training, while the elderly who experienced depression fell by 18 people. For the elderly who experience cognitive impairment decreased by 18 people and elderly who have high quality of life increased by 22 elderly. Yandu training for the elderly can improve the knowledge and skills of the elderly yandu cadre in the management of health problems in the elderly. Cadres empowerment can increase knowledge and skill of cadre to treat health problem in elderly.*

KEYWORDS *depression; social support; quality of life; elderly; traditional games*

1. Pendahuluan

Kesehatan lansia harus diperhatikan agar lansia sejahtera di usia senja. Sejak tahun 2000, Indonesia memasuki era masyarakat berstruktur tua (*ageing structured population*). Data sensus penduduk tahun 2010 menunjukkan bahwa jumlah lansia di Daerah Istimewa Yogyakarta (DIY) mencapai 12% dari jumlah penduduk dengan pertumbuhan 1,02% per tahun. Di Kabupaten Sleman, proporsi jumlah penduduk lansia pada tahun 2012 mencapai 10,7%, sedangkan proporsi penduduk lansia awal (usia 55-59 tahun) sebesar 3,69% dari jumlah penduduk.[1] Data sensus penduduk tahun 2015 menunjukkan bahwa Provinsi DIY mengalami peningkatan pertumbuhan lansia dari 0,7% menjadi 1,02%. Jumlah lansia di DIY mencapai 13,4% dari total jumlah penduduk sehingga pada 10 tahun ke depan di DIY diperkirakan akan terjadi ledakan jumlah penduduk lansia.[2]

DIY merupakan provinsi yang paling perlu diperhatikan karena mempunyai angka harapan hidup lansia tertinggi se-Indonesia. Usia harapan hidup lansia di Kabupaten Sleman mencapai lebih dari 72 tahun.[2] Proses menua merupakan proses yang secara alamiah terjadi terus-menerus atau berkelanjutan dan umumnya dialami oleh semua makhluk hidup. Manusia akan mengalami kemunduran baik struktur maupun fungsi organnya. Keadaan tersebut dapat menyebabkan berkurangnya kemampuan beradaptasi terhadap lingkungan. Menua adalah proses yang kompleks, meliputi aspek biologi, psikososial, budaya, dan perubahan pengalaman[3].

Perubahan-perubahan fisik yang terjadi meliputi terdapatnya penyakit kronis, penyakit degeneratif, dan sindrom metabolik, misalnya diabetes melitus, hipertensi, hiperkolesterolemia, obesitas, dan dislipidemia. Sindrom metabolik prevalensinya meningkat pada usia lanjut. Berbagai macam penyakit degeneratif dan penyakit kronis akan meningkatkan risiko gangguan jiwa. Sindrom metabolik juga dapat memicu terjadinya depresi.[4]

Depresi pada lansia merupakan hasil interaksi dari 3 faktor yaitu faktor biologi yang berupa hilangnya sejumlah neuron di otak, genetik, dan

penyakit fisik; faktor psikologi yang berupa rasa rendah diri dan kurang rasa keakraban; serta faktor sosial yang berupa kesepian dan gangguan interaksi sosial.[4] Depresi dapat menyebabkan gangguan pikir, bunuh diri, gangguan tidur, serta gangguan interaksi sosial, kognitif, dan memori. Depresi dapat menimbulkan dan memperberat penyakit degeneratif dan sindrom metabolik.[4]

Berdasarkan analisis masalah yang dapat terjadi pada lansia, dibutuhkan suatu upaya agar kesehatan lansia meningkat. Salah satu upaya untuk meningkatkan kesehatan lansia yaitu dengan memberikan pelatihan tentang memberikan sikap ramah terhadap lansia, memberikan pelatihan permainan kearifan budaya lokal, serta memberikan pelatihan dukungan sosial dan spiritual kepada kader yandu lansia. Kader yandu lansia merupakan salah satu perangkat desa yang mengurus semua kebutuhan terkait kesehatan lansia.

Saat ini masih sedikit penelitian mengenai efektivitas pelatihan pengetahuan dan keterampilan terkait deteksi dini depresi dan penanggulangan depresi pada lansia. Penulis tertarik untuk mengetahui pengaruh peningkatan pengetahuan dan keterampilan kader yandu lansia dalam menciptakan desa ramah dan sehat bagi lansia di Desa Purwobinangun, Sleman.

2. Metode

Pelatihan dilakukan pada bulan Juni sampai Oktober 2017 di Desa Purwobinangun, Sleman. Sasaran pelatihan adalah 53 kader yandu lansia dan 80 lansia di Desa Purwobinangun, Sleman. Instrumen penelitian yang digunakan adalah modul peningkatan kapasitas kader untuk menciptakan desa ramah dan sehat bagi lansia, instrumen *geriatric deppression scale* (GDS), *mini mental state examination* (MMSE), kuesioner tentang pengetahuan dan keterampilan permainan berbasis kearifan budaya lokal, serta kuesioner pengetahuan dan keterampilan deteksi dini dan penanggulangan depresi dengan dukungan sosial. Data disajikan secara deskriptif kuantitatif. Sebelum dan setelah pelatihan, dilaksanakan *pre-test* dan *post-test*.

3.1 Pre-test

Sebelum dilakukan pelatihan, dilakukan pemeriksaan awal tekanan darah dan status gizi, pengukuran tingkat depresi dengan instrumen GDS, fungsi kognitif menggunakan MMSE, dan penilaian kualitas hidup lansia serta pengukuran tingkat pengetahuan dan keterampilan kader yandu lansia tentang cara bersikap ramah terhadap lansia, senam otak, permainan berbasis kearifan budaya lokal, dan penanggulangan depresi lansia secara sosial spiritual.

3.2 Intervensi

Tim peneliti memberikan pelatihan cara bersikap ramah dan menghargai lansia, senam otak dan permainan berbasis kearifan budaya lokal kepada kader yandu lansia di Balai Desa Purwobinangun, sebanyak 6 kali pertemuan, masing-masing selama 2 jam, dalam waktu enam minggu. Setiap pertemuan berisi dua paket pelatihan ramah terhadap lansia, dua paket permainan berbasis kearifan budaya lokal dan dua paket senam otak.

Tim peneliti juga memberikan pelatihan penanggulangan depresi pada lansia secara sosial spiritual kepada kader yandu lansia Desa Purwobinangun, sebanyak 2 kali pertemuan, masing-masing selama 2 jam, dalam waktu dua minggu. Setiap pertemuan berisi cara-cara atau pendekatan dukungan sosial secara emosional, penghargaan, intrumental, informatif, dan spiritual.

Setelah kader diberikan pelatihan-pelatihan tersebut, tim peneliti mendampingi kader dalam memberikan intervensi kepada lansia.

3.3 Post-test

Setelah intervensi dilakukan, tim peneliti melakukan pemeriksaan tekanan darah dan status gizi, derajat depresi dan fungsi kognitif pada lansia dengan instrumen GDS dan MMSE, serta penilaian kualitas hidup lansia. Tingkat pengetahuan dan keterampilan kader dalam memberikan sikap ramah terhadap lansia, senam otak, permainan berbasis kearifan budaya lokal, dan penanggulangan depresi lansia secara sosial spiritual juga dinilai kembali. Hasil *pre-test* dan *post-test* kemudian dibandingkan.

Tabel 1. Karakteristik kader yandu lansia di Desa Purwobinangun(n=53)

Karakteristik	n	%
Umur		
30 – 45 tahun	11	20,75
46 – 55 tahun	36	67,92
> 55 tahun	6	11,32
Pendidikan		
SMP	16	30,18
SMA/SMK	39	73,58
PT	8	15,09
Pekerjaan		
Ibu Rumah Tangga	25	47,16
Petani	16	30,18
Pengawai Negeri Sipil	12	22,64

SMP: sekolah menengah pertama; SMA: sekolah menengah atas; SMK: sekolah menengah kejuruan; PT: perguruan tinggi

3. Hasil

3.1 Karakteristik kader yandu lansia di Desa Purwobinangun

Kader yandu lansia di Desa Puwobinangun merupakan wanita dewasa yang masih tergolong produktif. Sebagian besar kader merupakan lulusan sekolah menengah atas (SMA) atau Sekolah menengah kejuruan (SMK). Hal ini menunjukkan bahwa tingkat pendidikan kader yandu lansia di Desa Purwobinangun cukup baik. Karakteristik kader yandu lansia secara rinci dipaparkan di Tabel 1.

3.2 Karakteristik lansia di Desa Purwobinangun

Tabel 2 menunjukkan bahwa sebagian besar lansia pada penelitian ini berusia 55-65 tahun (32 orang, 40%). Sisanya adalah lansia dengan usia > 66 tahun. Menariknya, ada 21 orang (26,25%) yang mengikuti kegiatan yandu lansia pada usia lebih dari 75 tahun. Lansia tersebut nampak antusias mengikuti seluruh rangkaian kegiatan. Sebagian lansia juga masih produktif, baik bekerja sebagai pegawai negeri sipil (PNS), maupun menjadi buruh tani (ikut mengolah lahan pertanian orang lain). Sebagian yang lain merupakan pensiunan, atau sudah tidak bekerja (hanya beraktivitas di rumah). Karakteristik lansia secara rinci dipaparkan pada Tabel 2.

Tabel 2. Karakteristik lansia di Desa Purwobinangun (n=80)

Karakteristik	n	%
Umur		
55 – 65 tahun	32	40,00
66 – 75 tahun	27	33,75
>75 tahun	21	26,25
Pendidikan terakhir		
SD/SR	34	42,50
SMP	19	23,75
SMA/SMK	25	31,25
PT	2	2,50
Pekerjaan		
Pensiun	11	13,75
Buruh tani	36	45,00
Ibu rumah tangga/tidak bekerja	27	33,75
Pegawai negeri sipil	6	7,50
Penghasilan		
<1.000.000	22	27,50
1.000.000 – 2.000.000	29	36,25
>2.000.000	29	36,25

SD: sekolah dasar; SR: sekolah rakyat; SMP: sekolah menengah pertama; SMA: sekolah menengah atas; SMK: sekolah menengah kejuruan; PT: perguruan tinggi

3.3 Kecenderungan gangguan kesehatan pada lansia di Desa Purwobinangun sebelum pelatihan

Setelah dilakukan pemeriksaan, diperoleh data seperti yang tertera pada Tabel 3. Terdapat lansia dengan hipertensi sebanyak 52 orang (65%). Dengan demikian, sebagian besar lansia mengalami hipertensi yang menjadi faktor risiko gangguan kesehatan lainnya. Selain itu, penelitian ini juga menunjukkan bahwa terdapat 37 orang (46,25%) yang menderita diabetes melitus.

Setelah dilakukan wawancara dan pengisian kuesioner, didapatkan 57 orang (71,25%) lansia mengalami kecenderungan depresi. Angka ini termasuk tinggi. Sebagian lansia juga memiliki

Tabel 3. Gangguan kesehatan dan kualitas hidup pada lansia di Desa Purwobinangun sebelum pelatihan kader yandu

Gangguan kesehatan	Distribusi Frekuensi	
	n	%
Hipertensi		
Ya	52	65
Tidak	28	35
Diabetes melitus		
Ya	37	46,25
Tidak	43	53,75
Kecenderungan depresi		
Ya	57	71,25
Tidak	23	28,75
Fungsi kognitif		
Tidak ada gangguan	16	20
Gangguan sedang	55	68,75
Gangguan berat	9	11,25
Kualitas hidup		
Tinggi	29	36,25
Rendah	51	63,75

kualitas hidup yang rendah (Tabel 3).

3.4 Perubahan tingkat pengetahuan kader yandu lansia tentang penanggulangan gangguan kesehatan pada lansia setelah pelatihan

Setelah dilakukan pelatihan, tingkat pengetahuan kader yandu lansia mengenai penanggulangan gangguan kesehatan pada lansia mengalami peningkatan. Nilai pengetahuan terhadap permainan berbasis kearifan budaya lokal mengalami peningkatan sebesar 30, sedangkan pengetahuan tentang dukungan sosial dan religius mengalami peningkatan nilai rata-rata dari 25,5 menjadi 75,5. Pengetahuan tentang senam otak dan ramah lansia juga mengalami peningkatan nilai sebesar 40 dan 50 (Tabel 4).

3.5 Perubahan tingkat keterampilan kader yandu lansia dalam penanggulangan gangguan kesehatan pada lansia setelah pelatihan

Keterampilan kader yandu lansia dalam penanggulangan gangguan kesehatan pada lansia meningkat setelah diberikan pelatihan. Peningkatan keterampilan yang paling tinggi adalah keterampilan kader yandu lansia dalam mempraktikkan cara bersikap ramah terhadap lansia (28,68). Sedangkan peningkatan keterampilan terendah ditemukan pada aspek pemberian dukungan sosial, yaitu hanya sebesar 19,81 (Tabel 5).

3.6 Perubahan kecenderungan gangguan kesehatan pada lansia di Desa Purwobinangun setelah pelatihan

Setelah kader yandu lansia dibekali pengetahuan dan keterampilan dalam deteksi dini dan penanggulangan gangguan kesehatan pada lansia dan mengimplementasikannya pada lansia, dilakukan pemeriksaan ulang gangguan kesehatan yang dialami oleh lansia di Desa Purwobinangun.

Lansia yang mengalami hipertensi turun 7 orang, yaitu dari 52 orang menjadi 45 orang. Hal tersebut menunjukkan bahwa pelatihan berdampak baik dan dirasakan langsung oleh lansia. Kader menjadi lebih paham bagaimana mengenali, mendeteksi dini, dan melakukan manajemen terhadap hipertensi dan diabetes melitus. Tidak hanya mahir dalam melakukan pengukuran tekanan darah, namun kader juga paham bagaimana mengajak lansia melakukan manajemen hipertensi secara tepat. Kader yandu lansia juga semakin paham bagaimana manajemen diabetes melitus pada lansia.

Lansia yang mengalami kecenderungan depresi mengalami penurunan sebanyak 18 orang. Selain itu, fungsi kognisi dan kualitas hidup lansia juga semakin baik. Hal tersebut menunjukkan bahwa pelatihan memberikan dampak yang baik dan langsung terhadap kesehatan jiwa dan kualitas hidup lansia. Selama pelatihan kader memberikan dukungan sosial dan religius dengan memberikan perhatian, kasih sayang, penghargaan, nasihat-nasihat, dan menampakkan sikap ramah kepada lansia. Pelaksanaan permainan berbasis kearifan budaya lokal membuat lansia tertawa dan bahagia. Lansia juga berlatih untuk melakukan senam revitalisasi otak yang dapat meringankan dan mencegah gangguan fungsi kognitif yang sering

Tabel 4. Perubahan tingkat pengetahuan kader yandu lansia tentang penanggulangan gangguan kesehatan pada lansia setelah dilakukan pelatihan

Pengetahuan penanggulangan	Nilai rata-rata		Perubahan
	Sebelum	Setelah	
Permainan kearifan budaya lokal	60,5	90,5	+30
Dukungan sosial dan religius	25,5	75,5	+50
Senam otak	25,5	65,5	+40
Ramah lansia	35,5	80,5	+50

Tabel 5. Perubahan tingkat keterampilan kader yandu lansia dalam penanggulangan gangguan kesehatan pada lansia setelah dilakukan pelatihan

Keterampilan penanggulangan	Nilai rata-rata		Perubahan
	Sebelum	Setelah	
Permainan kearifan budaya lokal	67,03	84,15	+17,12
Dukungan sosial	52,83	72,64	+19,81
Senam otak	22,45	51,13	+28,68
Ramah lansia	48,83	76,41	+27,58

Tabel 6. Perubahan frekuensi gangguan kesehatan dan kualitas hidup lansia di Desa Purwobinangun setelah dilakukan pelatihan

Gangguan kesehatan	Sebelum pelatihan		Setelah pelatihan		Perubahan	
	n	%	n	%	n	%
Hipertensi						
Ya	52	65	45	56,25	-7	13,46
Tidak	28	35	35	43,75	+7	20
Diabetes Melitus (DM)						
Ya	37	46,25	37	46,25	0	0
Tidak	43	53,75	43	53,75	0	0
Kecenderungan depresi						
Ya	57	71,25	39	48,75	-18	31,57
Tidak	23	28,75	41	51,25	+18	43,9
Fungsi Kognitif						
Tidak ada gangguan	16	20	29	36,25	+13	44,83
Gangguan sedang	55	68,75	42	52,5	-13	23,64
Gangguan berat	9	11,25	9	11,25	0	0
Kualitas Hidup						
Tinggi	29	36,25	51	63,75	+22	43,13
Rendah	51	63,75	29	36,25	-22	43,13

diderita oleh lansia. Selain itu, lansia berlatih melakukan senam sendi untuk mempertahankan fungsi fisiologis sendi secara optimal, mencegah secara dini terjadinya penyakit degeneratif seperti diabetes melitus, hiperurisemia, hipertensi, dan penyakit kardiovaskuler lainnya, serta mempertahankan pola tidur yang normal.

4. Pembahasan

Penelitian ini menunjukkan bahwa terjadi peningkatan baik pengetahuan maupun keterampilan kader setelah dilakukan pelatihan. Kader merasa sudah melakukan hal-hal yang berhubungan dengan dukungan sosial dan religius, serta ramah terhadap lansia dalam kehidupan sehari-hari, namun baru mengetahui bahwa hal tersebut merupakan salah satu cara penanggulangan gangguan kesehatan pada lansia setelah mendapatkan pelatihan.

Pemberian sentuhan dan kasih sayang yang menimbulkan kontak kulit akan meningkatkan kerja sistem saraf perifer sehingga dapat memperbaiki tekanan darah dan denyut jantung, serta menyebabkan kondisi menjadi rileks.[5] Pemberian pujian kepada lansia akan meningkatkan dopamin yang bertanggungjawab terhadap sistem penghargaan sehingga lansia merasa dihargai dan dicintai oleh kader. Hal tersebut membuat lansia akan memiliki rasa percaya diri dan terhindar dari depresi.[5]

Lansia yang memiliki kadar oksitosin yang cukup akan mampu bersosialisasi dengan baik terhadap lingkungan sekitarnya. Penelitian terdahulu juga menyebutkan bahwa oksitosin memiliki efek *anxiolytic* yaitu mengurangi kecemasan.[6] Dalam kegiatan pemberian dukungan sosial emosional, penghargaan, instrumental, informatif, dan spiritual, lansia mendapatkan kenikmatan berupa perasaan puas, tenang, nyaman dan damai yang akan meningkatkan dopamin.[6] Lansia yang mendapatkan perasaan dihargai, dicintai, dan ditenangkan akan meningkat kadar dopaminnya. Mendapatkan kenikmatan berupa perasaan dipercaya terhadap kemampuannya dalam melakukan permainan, mampu meningkatkan hormon oksitosin.[7] Dukungan sosial meningkatkan perasaan senang, dimana akan menurunkan kadar hormon kortisol.[8] Peningkatan dopamin dan oksitosin, serta penurunan kadar kortisol berdampak terhadap penurunan depresi dan peningkatan imunitas. Dukungan sosial dapat memengaruhi kesehatan mental dan fisik, serta kognisi dan perilaku.[9]

Kegiatan dukungan spiritual akan meningkatkan motivasi lansia dalam melakukan kegiatan-kegiatan religius dan ritual-ritual kepercayaan. Dalam kegiatan ritual, seperti berdoa, berzikir, dan sholat berjamaah dapat menghilangkan stres, meningkatkan rasa aman, semangat, dan cinta serta menurunkan depresi pada lansia.

Kegiatan-kegiatan ritual seperti berdoa bersama, ziarah bersama, dan mengikuti upacara ritual terbukti menguatkan kepercayaan diri, meningkatkan rasa tentram, rasa aman, dan menurunkan depresi. Pelaksanaan kegiatan spiritual akan meningkatkan endorfin, serotonin, dopamin, dan melantonin, serta menurunkan kadar kortisol, sehingga dapat menurunkan risiko depresi dan meningkatkan imunitas.

Beberapa dukungan yang diberikan selama pelatihan dapat meningkatkan rasa senang dan percaya diri pada lansia tentang kesehatannya, kemampuannya dan keberhasilannya dalam membina keluarga. Dukungan sosial akan meningkatkan kualitas hidup secara fisik, psikologis, maupun sosial. Dukungan sosial instrumental akan meningkatkan rasa aman, senang dan tenang. Bentuk dukungan sosial instrumental yang diberikan kader yaitu sentuhan, pelukan, dibantu berdiri, dan digandeng. Domain psikologis yang meningkat menjadikan lansia merasa aman, senang, dan percaya diri. Lansia secara fisik merasa menjadi lebih sehat dan kuat, serta nyeri sendinya berkurang sehingga menjadikan mereka lebih aktif mengikuti kegiatan. Lansia yang secara fisik merasa sehat akan menjadi lebih berani untuk mengikuti kegiatan di masyarakat.

Kegiatan permainan berbasis kearifan budaya lokal yang dilakukan sambil menyanyi dan menari bersama memberikan keuntungan secara fisik,

misalnya peningkatan koordinasi dan kekuatan otot. Ditinjau secara emosional, permainan berbasis kearifan budaya lokal membantu proses eksplorasi emosi seperti rasa kehilangan yang sulit diungkapkan secara verbal, kemarahan, frustasi, dan membantu lansia merasa lebih gembira. Dari segi sosial, permainan berbasis kearifan budaya lokal dapat mengurangi perasaan terisolasi dan meningkatkan keterampilan bersosialisasi. Secara mental, permainan tersebut meningkatkan keterampilan kognitif, ingatan, dan motivasi, serta mengurangi stres dan kecemasan. Permainan dan lagu tradisional yang sesuai dengan kearifan budaya lokal dan mempunyai nilai-nilai luhur dan filosofi Jawa yang sangat kuat akan meningkatkan semangat, mengurangi stres, menimbulkan perasaan senang dan meningkatkan imunitas.[10,11]

Peningkatan keterampilan permainan berbasis kearifan budaya lokal pada kader yandu lansia dan lansia dapat meningkatkan rasa senang, memberikan rasa gembira, menyebabkan tertawa lepas, dan dapat melepaskan stres dalam rutinitas sehari-hari sebagai ibu rumah tangga, baik bagi kader yandu, maupun para lansia. Secara teoritis kegembiraan disertai tertawa lepas dapat mempengaruhi kadar neurotransmiter dan hormon-hormon di otak. Neurotransmiter tersebut adalah dopamin, serotonin, oksitosin, dan endorfin. Dopamin berhubungan dengan kadar kepuasan dan kadarnya akan meningkatkan bila seseorang sebagai individu merasa penting bagi orang lain. Kadar oksitosin akan meningkat bila orang saling mempercayai satu sama lain. Kadar endorfin akan meningkat bila seseorang merasa bahagia dan rileks.[5]

Kader yandu lansia bersama dengan lansia bermain secara berkelompok sehingga lansia mendapatkan kepuasan karena lansia mempunyai kebutuhan untuk diajak kegiatan-kegiatan, dihargai, disayang, dipuji, dan dipeluk. Harga diri pada lansia meningkat karena sebagian besar permainan yang diajarkan membutuhkan kerjasama yang baik antar lansia. Dengan demikian lansia akan merasa bahwa dirinya penting dan mampu. Adanya kerjasama ini juga menumbuhkan rasa saling percaya pada lansia. Bermain berkelompok merupakan salah satu bentuk psikoterapi kelompok. Bentuknya yag berupa *self-help* bertujuan untuk mendapatkan dukungan sosial, berbagi pengalaman hidup, berbagi emosi, terdapat kehomogenan dalam kelompok.[12] Permainan yang menyenangkan juga menciptakan suasana yang santai dan rileks yang memengaruhi kondisi kejiwaan lansia. Semua hal tersebut terkait dengan harmonisasi keempat neurotransmiter di atas.

Permainan yang menyenangkan menyebabkan perubahan fisiologis pada beberapa sistem dalam tubuh. Sistem tersebut antar lain sistem muskuloskeletal, sistem kardiovaskular, sistem endokrin, serta sistem saraf.[13] Selain itu, permainan yang menyenangkan juga menyebabkan perubahan pada sistem kerja katekolamin dan kadar kortisol sehingga memengaruhi sistem imun.[4,13,14] Tertawa terbahak-bahak dapat mengurangi ketegangan otot, menurunkan tekanan darah, meningkatkan oksigenase jaringan, melatih kekuatan jantung, dan memicu produksi endorfin. Tertawa secara berkelompok lebih efektif dibanding tertawa secara individual dalam meningkatkan kesehatan. Tertawa bersama-sama dapat meningkatkan *endorphin surge* (lonjakan endorfin) yang dapat ditularkan pada teman-teman yang lain. Hal ini sangat bermanfaat untuk interaksi sosial dan meningkatkan kepuasan diri.[15]

Pada setiap awal dan akhir permainan selalu diawali dengan berdoa dan bernapas dalam untuk pemanasan dan pendinginan. Hal tersebut juga dapat meningkatkan relaksasi, sehingga menurunkan depresi. Bernapas dalam meningkatkan sinkronisasi sistem *cardiorespiratory*, memodulasi *autonomic nervous system* dan aktivitas amigdala, mempertahankan homeostasis di seluruh tubuh termasuk otak, serta memengaruhi kadar dan respons neurotransmiter yang dapat mengurangi atau mencegah *mood negative.*[16] Pemberian sentuhan dan pujian setiap selesai permainan akan meningkatkan rasa percaya diri, dihargai, senang, dan semangat, serta meningkatkan endorfin dan menurunkan depresi.[17] Permainan kearifan budaya lokal dapat

menurunkan depresi, meningkatkan fungsi kognitif, dan meningkatkan kualitas hidup.[11,18]

Pelatihan bersikap ramah terhadap lansia memberisi cara memberikan senyuman dengan penuh empati dan memberikan sapaan salam, serta sentuhan yang baik dan santun. Senyum, sapaan, salam, dan sentuhan yang diberikan dengan tulus pada lansia akan meningkatkan rasa senang, tenang, aman, dan percaya diri, serta meningkatkan hormon endorfin, serotonin, dopamin, dan oksitosin, yang pada akhirnya akan meningkatkan kesehatan mental dan fisik.

Gerakan-gerakan yang dilakukan dalam senam otak dapat memberikan rangsangan yang adekuat untuk memacu fungsi otak. Rangsangan yang diberikan pada dimensi lateral akan mengoptimalkan fungsi-fungsi hemisfer otak yang berhubungan erat dengan fungsi kognitif. Rangsangan yang ditimbulkan pada dimensi pemusatan dapat meningkatkan hubungan antar neuron sehingga dapat membantu lansia terhindar dari kemunduran fungsi kognitif.[3] Dimensi pemusatan dapat mengoptimalkan komunikasi antara sistem limbik yang berperan dalam informasi emosional dengan serebrum yang berfungsi dalam pemikiran abstrak. Gerakan-gerakan tersebut dapat mengaktifkan ingatan dan daya pikir yang melibatkan sistem limbik dan serebrum.[3] Keempat hal yang dilatihkan dapat meningkatkan kesehatan fisik, menurunkan depresi, meningkatkan fungsi kognitif, dan meningkatkan kualitas hidup.

5. Kesimpulan

Pelatihan penanggulangan gangguan kesehatan lansia yang terdiri dari pelatihan permainan berbasis kearifan budaya lokal, dukungan sosial dan religius, senam otak, serta cara bersikap ramah pada kader yandu lansia di Desa Purwobinangun dapat meningkatkan pengetahuan dan keterampilan kader yandu lansia dalam penanggulangan gangguan kesehatan fisik, kecenderungan depresi, dan gangguan fungsi kognitif, serta meningkatkan kualitas hidup pada lansia. Peningkatan pengetahuan dan keterampilan kader yandu lansia di Desa Purwobinangun dapat meningkatkan kesehatan fisik, menurunkan kecenderungan depresi, meningkatkan fungsi kognitif, dan meningkatkan kualitas hidup lansia.

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Daftar pustaka

1. Pusat Data dan Informasi Kemenkes. Infodatin Lansia : Situasi Lanjut Usia di Indonesia. Kementrian Kesehatan RI. 2016.
2. Badan Pusat Statistik. *Statistik Penduduk Lanjut Usia*. Statistik Indonesia. 2016
3. Faham M, Sagiran. Pengaruh Brain Gym terhadap Fungsi Kognitif pada Usia Lanjut. Mutiara Medika Jurnal Kedokteran dan Kesehatan. 2009; 9(2): 86-94.
4. Hubert W. De Jong MR. Autonomie, Neuroendocrine, And Subjective Responses To Emotion Inducing Film Stimuli. Int J Psychophysiol. 1991; PP 73-93.
5. Stahl SM. *Stahl's Essential Psychopharmacology:*

Neuroscientific Basis and Practical Applications, 3rd edition. New York: Cambridge University Press. 2008.

6. Camara E, Forlena AR, Munte TF. Reward Network In The Brain As Captured By Connectivity Measures. *Front Neurosci*. 2009; 3(3): 350-360.
7. Miyazaki T, Takase K, Nakajima W, Tada H, Ohya D, Sano A, Goto T. Disrupted Cortical Function Underlies Behavior Disfunction Due to Social Isolation. *J Clin Invest*, 2012 July; 122 (7): 2690-2701.
8. McEwen BS, Mirsky AE, Hatch MM. Physiologi and Neurobiology of Stress and Adaptation Central Role Of The Brain. *Psysiol.* 2017; 87: 873-904.
9. McCorkle B, Tugers ES, Dunn EC, Wan YM. Increasing Social Support For Individuals With Serious Mental Illness: Evaluating The Compeer Model Of Intentional Friendship. *Community Ment Health J*; 2008.
10. Hartoto. *Pedidikan Rekreasi*. FPOK IKIP Yogyakarta. 1995.
11. Sumarni DW. Pengaruh Permainan Humor Kearifan Budaya Lokal dan Dukungan Spiritual terhadap Depresi, Gangguan Interaksi Sosial, Gangguan Kognitif dan Kualitas Tidur Lansia di Huntap Gondang Kabupaten Sleman. Laporan Penelitian. Fakultas Kedokteran, Kesehatan Maysrakat, dan Keperawatan Universitas Gadjah Mada. 2012.
12. Kaplan HL, Friedman AM, Sadock BJ. Comprehensive Textbook of Psychiatry, William Wilkins, Baltimore. 2017.
13. Fry, William F. The Biology Of Humor. Int J Humor Res. 2004; 7(2): 111-126
14. McDaniel ND. Touching Makes You Healthier. *Health Magazine*. 2011 [Cited 20 Agustus 2018]. Available from: http://edition.cnn.com/2011/HEALTH/01/05/touching.makes.you.healtier.health/index.htm>
15. Akbaraly TN, Ancelin M, Jaussent I. Metabolic Syndrome and Onset of Depressive Symptoms in the Elderly.*Diabetes Care*. 2011; 34: 904-909.
16. Jerath R. Self-regulation of Breathing as a Primary Treatment for Anxiety. *Appl Psychophysiol Biofeedback*. 2015;40(2):107-15
17. Niel RC. *Physiologi of Behavior 8th*. Boston. America. 2004.
18. Sumarni, Identifikasi Gangguan Mental, Gangguan Reproduksi, dan Faktor-Faktor yang Mempengaruhi, Serta Upaya Penanganannya pada Remaja SLTP Pasca Erupsi Merapi di Kabupaten Sleman. Laporan Penelitian. Fakultas Kedokteran, Kesehatan Maysrakat, dan Keperawatan Universitas Gadjah Mada. 2014.

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Pembinaan Desa Wisata Sehat Gabugan dengan melibatkan mahasiswa interprofesi dalam melatih kader Program Indonesia Sehat – Pendekatan Keluarga (PIS-PK)

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ABSTRAK Tujuan Pemerintah Indonesia mencanangkan Program Indonesia Sehat dengan Pendekatan Keluarga (PIS-PK) adalah untuk meningkatkan kesehatan masyarakat secara umum di bawah pengelolaan Puskesmas. Namun, hingga saat ini Puskesmas masih merasa kesulitan untuk menjangkau seluruh keluarga dalam wilayah kerjanya sehingga perlu partisipasi relawan atau kader dari masing-masing desa. Desa Wisata Gabugan merupakan sebuah desa wisata edukatif yang mengembangkan konsep desa wisata sehat. Untuk menyukseskan diri sebagai desa wisata sehat PIS-PK pemerintah desa bekerjasama dengan Fakultas Kedokteran, Kesehatan Masyarakat, dan Keperawatan, Universitas Gadjah Mada (FK-KMK UGM) menyelenggarakan pelatihan dan pendampingan kader dengan dukungan mahasiswa interprofesional. Penelitian ini ditujukan untuk mengidentifikasi nilai indeks keluarga sehat (IKS) di Desa Wisata Gabugan serta membandingkan tingkat pengetahuan kader sebelum dan sesudah pelatihan tentang PIS-PK. Penelitian ini adalah *action research* dengan metode deskriptif kuantitatif. Pengambilan data dilakukan pada tanggal 4 Agustus 2018 hingga 7 September 2018. Subjek merupakan keluarga dan kader kesehatan di Desa Wisata Gabugan, Turi, Sleman. Sebanyak 50 keluarga dari jumlah populasi 100 keluarga disurvei untuk mendapatkan Indeks Keluarga Sehat (IKS). Kader kesehatan mengikuti pelatihan PIS-PK dengan topik utama desa wisata sehat. Sebelum dan sesudah pelatihan, kader mengikuti *pre-test* dan *post-test*. Hasil survei dianalisis secara statistik dengan metode deskriptif kuantitatif, sementara *Wilcoxon test* digunakan untuk membandingkan skor *pre-test* dan *post-test*. Dari sampel 50 keluarga, didapatkan rerata IKS sebesar 0,810. Indikator dengan cakupan tertinggi adalah akses sarana air bersih dan penggunaan jamban sehat, sedangkan indikator dengan cakupan terendah adalah penderita hipertensi melakukan pengobatan secara teratur. Hasil *pre-test* dan *post-test* kader menunjukkan peningkatan nilai rerata sebesar 3,823 dengan nilai p = 0,000. Keluarga di Desa Wisata Gabugan secara umum masuk dalam kategori sehat. Pelatihan kesehatan dengan melibatkan mahasiswa interprofesional terbukti mampu meningkatkan pengetahuan kader PIS-PK secara signifikan.

KATA KUNCI desa wisata sehat; kader kesehatan; mahasiswa interprofesi; PIS-PK

ABSTRACT *The Government of Republic of Indonesia launched Healthy Indonesia Program with Family-Centered Approach (PIS-PK). This program intended to improve public health in commons beneath the management of public health care. However, it remains challenging for public health care to reach all families in the working area. Active participation from volunteers or cadres to encourage the implementation*

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of this program is required. Gabugan Tourism Village is an educational tourism village in a vision to develop the concept of healthy tourism village. Determination from the local government to achieve healthy tourism village taken by joining collaboration with Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada (FK-KMK UGM). Together with interprofessional students from the campus, local government arranged training for cadre and assist during program implementation. This study aimed to identify the Healthy Family Index (HFI) of residents in the Gabugan Tourism Village and evaluate the cadre's level of knowledge before and after training sessions. This was action research with a quantitative descriptive method. Data collected from August 4th, 2018 to September 7th, 2018. Research subjects were family and health cadres. Sample of 50 families from 100 families population surveyed to discover Healthy Family Index (HFI), while cadres were receiving training session related to healthy tourism villages. Pre-test and post-test followed by cadres during the training session. Survey results analyzed using quantitative descriptive, meanwhile, Wilcoxon tests set to compare pre-test and post-test scores. From 50 families an HFI average of 0.810 obtained. The highest indicator of healthy family index was access to clean water facilities and the use of healthy latrines. The lowest index found at hypertension patients taking regular medication. The results of pre-test and post-test cadres indicated rising average with value of 3,823 and p-value = 0,000. Families in Gabugan Tourism Village generally in the healthy group. Training program involving interprofessional students proven to significantly increase the knowledge of health cadres.

KEYWORDS *healthy tourism village; health cadres; interprofessional students; PIS-PK*

1. Pendahuluan

Program Indonesia Sehat merupakan salah satu program dari agenda ke-5 Nawa Cita yaitu meningkatkan kualitas hidup manusia. Salah satu program untuk mendukung tercapainya Program Indonesia Sehat dalam rencana strategis Kementerian Kesehatan Tahun 2015 – 2019 yaitu Program Indonesia Sehat dengan Pendekatan Keluarga (PIS-PK).[1] Pendekatan keluarga adalah salah satu cara puskesmas untuk meningkatkan jangkauan sasaran dan mendekatkan atau meningkatkan akses pelayanan kesehatan di wilayah kerjanya dengan mendatangi keluarga. Puskesmas tidak hanya menyelenggarakan pelayanan kesehatan di dalam gedung, melainkan juga keluar gedung dengan mengunjungi keluarga di wilayah kerjanya. Puskesmas akan dapat mengenali masalah kesehatan dan Perilaku Hidup Bersih dan Sehat (PHBS) yang dihadapi keluarga secara lebih menyeluruh (holistik) dengan mengunjungi keluarga di rumahnya. Individu anggota keluarga yang perlu mendapatkan pelayanan kesehatan kemudian dapat dimotivasi untuk memanfaatkan Usaha Kesehatan Bersumber daya Masyarakat (UKBM) yang ada dan atau pelayanan puskesmas. Keluarga juga dapat dimotivasi untuk memperbaiki kondisi kesehatan lingkungan dan berbagai faktor risiko lain yang selama ini merugikan kesehatannya dengan pendampingan dari kader-kader kesehatan UKBM dan atau petugas profesional puskesmas.[2] PIS-PK ini dilaksanakan di seluruh wilayah Indonesia, termasuk di daerah Kabupaten Sleman. Permasalahan yang dihadapi oleh penyelenggara program adalah minimnya kesiapan puskesmas untuk menjangkau masyarakat. Selain itu, keterbatasan sumber daya manusia yang menguasai dan memahami PIS-PK secara menyeluruh ditemukan di berbagai wilayah di Indonesia.[3,4]

Program *Community and Family Health Care with Interprofessional Education* (CFHC-IPE) merupakan program pembelajaran lintas disiplin ilmu di Fakultas Kedokteran, Kesehatan Masyarakat, dan Keperawatan Universitas Gadjah Mada (FK-KMK UGM) yang menggabungkan ketiga program studi yaitu Pendidikan Dokter, Ilmu Keperawatan, dan Gizi Kesehatan.[5] Program CFHC-IPE FK-KMK UGM memiliki beberapa daerah mitra di Kabupaten Sleman. Kecamatan Turi adalah salah satu mitra FK-KMK UGM. Pada penelitian ini dipilih Desa Wisata Gabugan yang berada dalam wilayah administratif Kecamatan Turi. Daerah tersebut sangat berpotensi

untuk menjadi percontohan karena merupakan salah satu desa wisata edukatif yang cukup banyak dikunjungi wisatawan. Perangkat desa ingin pelaksanaan PIS-PK dapat berjalan dengan baik dan menjadi salah satu topik edukasi yang layak dijual kepada wisatawan yang berkunjung. Pemberian informasi dan edukasi mengenai PIS-PK menjadi hal yang penting dilakukan untuk menyukseskan PIS-PK di negara kita yang rencananya akan dirampungkan pada tahun 2019. Penelitian ini mengedukasi masyarakat melalui kegiatan penyuluhan inovatif yang melibatkan mahasiswa interprofesi kesehatan dan kader PIS-PK dengan harapan masyarakat menjadi lebih memahami PIS-PK serta penerapannya dalam kehidupan masyarakat. Penelitian ini dilakukan untuk mengetahui nilai indeks keluarga sehat (IKS) warga di Desa Wisata Gabugan dan membandingkan tingkat pengetahuan kader sebelum dan sesudah pelatihan tentang PIS-PK.

2. Metode

Penelitian ini adalah *action research* dengan desain *pre-test* dan *post-test*. Program intervensi yang dilaksanakan adalah pelatihan terhadap kader kesehatan di Desa Wisata Gabugan dengan melibatkan narasumber ahli dan mahasiswa interprofesi kesehatan dari FK-KMK UGM. Kader dan mahasiswa interprofesi sejumlah 12 orang bersama-sama terjun ke lapangan untuk memberikan penyuluhan dan pendampingan terkait materi PIS-PK sekaligus melakukan survei kesehatan dengan menggunakan kuesioner untuk melihat IKS masing-masing keluarga sesuai dengan panduan PIS-PK. Keluarga yang disurvei secara acak sejumlah 50 keluarga dari 100 keluarga di wilayah Desa Wisata Gabugan. Pengambilan data PIS-PK ke 50 keluarga dilakukan pada tanggal 4 Agustus 2018 sampai dengan 7 September 2018.

Setelah itu, penelitian dilanjutkan untuk kader kesehatan sebagai subjek. Kader diberi pelatihan tentang PIS-PK yang terkait dengan konsep desa wisata sehat dengan melibatkan ahli di bidang terkait dan mahasiswa interprofesi kesehatan dari FK-KMK UGM. Pelatihan dilaksanakan pada tanggal 16 September 2018. Metode yang digunakan adalah pelatihan interaktif dua arah dengan media LCD *projector* dan tanya jawab. Instrumen untuk mengukur tingkat pemahaman kader kesehatan sebelum dan sesudah diberi pelatihan berupa soal *pre-test* dan *post-test* masing-masing berisi 15 soal. Soal-soal tersebut dikembangkan oleh peneliti dari materi pelatihan PIS-PK.

Analisis hasil survei dilakukan dengan metode analisis deskriptif kuantitatif oleh dua orang *coder* dari tim peneliti dengan latar belakang bidang ilmu kedokteran dan keperawatan. Peningkatan pengetahuan kader terkait PIS-PK dianalisis menggunakan *Wilcoxon test*.

3. Hasil

3.1 Survei indeks keluarga sehat

Pengambilan data dilakukan oleh tim mahasiswa interprofesi bersama kader kesehatan pada keluarga yang tinggal di Desa Wisata Gabugan. Jumlah responden sebanyak 50 keluarga dari populasi sejumlah 100 keluarga dapat tercapai seluruhnya (*response rate 100%*). Pemilihan keluarga dilakukan secara acak namun merata dengan pembagian sampel menggunakan pembagian dasawisma. Tabel 1 menunjukkan karakteristik 50 keluarga yang disurvei. Rerata jumlah anggota keluarga sebanyak 3,360 tiap keluarga dengan rerata IKS sebesar 0,810.

Tabel 1. Karakteristik keluarga yang disurvei

Karakteristik	
Jumlah anggota keluarga, n (%)	
1	3 (6)
2	13 (26)
3	9 (18)
4	16 (32)
>4	9 (18)
Rerata jumlah anggota keluarga	3,360
Nilai IKS keluarga, n (%)	
>0,8	21 (42)
0,5 – 0,8	29 (58)
<0,5	0 (0)
Rerata IKS	0,810
Median IKS	0,800
Modus IKS	0,800

Tabel 2. Cakupan indikator keluarga sehat

Indikator Keluarga Sehat	n
Indikator dengan cakupan tertinggi	
Keluarga mempunyai akses sarana air bersih	50
Keluarga mempunyai akses atau menggunakan jamban sehat	50
Keluarga sudah menjadi anggota Jaminan Kesehatan Nasional (JKN)	45
Indikator dengan cakupan terendah	
Keluarga mengikuti program Keluarga Berencana (KB)	19
Anggota keluarga tidak ada yang merokok	17
Penderita hipertensi melakukan pengobatan secara teratur	11

Tabel 2 menunjukkan indikator dengan cakupan tertinggi yaitu keluarga mempunyai akses sarana air bersih dan keluarga mempunyai akses atau menggunakan jamban sehat, diikuti oleh keluarga sudah menjadi anggota JKN. Indikator dengan cakupan terendah meliputi penderita hipertensi melakukan pengobatan secara teratur, anggota keluarga tidak ada yang merokok, dan keluarga mengikuti program Keluarga Berencana (KB).

3.2 Pre dan Post Test Kader Kesehatan

Kader kesehatan yang terlibat dalam program ini sejumlah 17 orang. Sampel ini merupakan total jumlah kader yang ada di Desa Wisata Gabugan. Tabel 3 merangkum karakteristik kader yang terlibat dalam penelitian ini.

Tabel 3 menunjukkan bahwa 76% kader kesehatan adalah perempuan. Sebagian besar kader berada dalam usia produktif yaitu 7 orang (41%) berusia 25-40 tahun dan 7 orang (41%) berusia 41-60 tahun. Pendidikan terakhir kader yang terbanyak adalah SLTA yaitu sebanyak 11 orang. Satu orang tidak mau menyebutkan pendidikan terakhirnya. Pekerjaan kader yang paling banyak ditemui dalam penelitian ini adalah ibu rumah tangga, sebanyak 9 orang, lalu yang kedua adalah swasta, sebanyak 3 orang.

Tabel 4 menunjukkan rerata nilai *pre-test*, *post-test*, dan rerata selisihnya. Terjadi peningkatan nilai sebesar 3,823. Setelah dianalisis menggunakan *Wilcoxon test*, didapatkan nilai *p* sebesar 0,000.

4. Pembahasan

Desa Wisata Gabugan adalah desa agrowisata yang terletak di Kecamatan Turi, Kabupaten Sleman. Desa ini memiliki suasana yang masih asri, nyaman, dan sejuk, dengan adat Jawa yang masih kental. Produk salak pondoh menjadi komoditas unggulan desa agrowisata ini. Dari data yang didapat, rerata jumlah anggota keluarga di Desa Wisata Gabugan adalah sebesar 3,360, lebih rendah dari rerata jumlah anggota keluarga di Indonesia pada tahun 2015 yang sebesar 3,90[6]. Hanya saja, pada laporan tersebut dinyatakan bahwa cakupan keluarga yang terdaftar hanya 1,7% dari seluruh keluarga di Indonesia. Selisih ini kurang begitu bisa digunakan untuk membandingkan jumlah anggota keluarga di Desa Wisata Gabugan karena cakupan pendataan nasional yang sangat kecil.

Rerata IKS di Desa Wisata Gabugan sebesar 0,810. Angka ini terbilang jauh lebih tinggi jika dibandingkan dengan rerata IKS di Indonesia yang hanya sebesar 0,163. Angka ini bahkan lebih tinggi jika dibandingkan dengan rerata IKS provinsi DKI Jakarta yang merupakan provinsi dengan IKS tertinggi di Indonesia sebesar 0,323. Namun, sama halnya dengan pendataan jumlah anggota keluarga Indonesia, pengambilan data IKS nasional hanya didapat dari sembilan provinsi dari 570.326 keluarga. Cakupan ini masih kurang representatif untuk menggambarkan kondisi IKS yang sebenarnya di Indonesia [6].

Pada tahun 2015 indikator keluarga sehat dengan cakupan tertinggi adalah keluarga

Tabel 3. Karakteristik kader kesehatan

Karakteristik	***n* (%)**
Jenis kelamin	
Perempuan	13 (76)
Laki-laki	4 (24)
Usia	
< 25 tahun	1 (6)
25-40 tahun	7 (41)
41-60 tahun	7 (41)
> 60 tahun	2 (12)
Rerata, tahun	41,94
Pendidikan terakhir	
SMP	2 (12)
SLTA	11 (65)
D3	1 (6)
S1	1 (6)
S2	1 (6)
Tidak menyebutkan	1 (6)
Pekerjaan	
Ibu rumah tangga	9 (53)
Swasta	3 (18)
Petani	2 (12)
Perangkat desa	1 (6)
Pelajar/mahasiswa	1 (6)
Tidak menyebutkan	1 (6)

Tabel 4. Deskripsi hasil penilaian *pretest* dan *posttest*

Variabel	
Rerata nilai *pre-test*	7,470
Rerata nilai *post-test*	11,294
Rerata selisih nilai *pre-test* dengan *post-test*	3,823
p-value Wilcoxon test	0,000

mempunyai akses sarana air bersih. Temuan ini selaras dengan temuan di Desa Wisata Gabugan. Namun, lain halnya dengan indikator dengan cakupan terendah. Di Indonesia, indikator dengan cakupan terendah adalah penderita gangguan jiwa berat diobati dan tidak ditelantarkan, sedangkan di Desa Wisata Gabugan adalah penderita hipertensi melakukan pengobatan secara teratur. Hal ini berbeda karena di Desa Wisata Gabugan hanya ada dua keluarga dengan anggota yang memiliki riwayat gangguan jiwa berat. Anggota keluarga tersebut sudah selesai berobat dan dapat beraktivitas seperti anggota keluarga lain. Pada tahun 2030, transisi epidemiologi dari penyakit menular menjadi penyakit tidak menular diperkirakan akan semakin jelas sehingga masyarakat perlu dihimbau untuk mengikuti posbindu guna mendapatkan tindakan preventif penyakit tidak menular[7]. Melalui program posbindu upaya skrining, pencegahan dan penatalaksanaan dapat dilakukan secara swadaya oleh masyarakat.

Kader kesehatan dalam penelitian ini mayoritas adalah perempuan. Kader juga didominasi oleh orang-orang yang masih berusia produktif. Hanya satu orang (6%) kader yang berusia di bawah 25 tahun dan hanya dua orang (12%) yang berusia di atas 60 tahun. Pekerjaan kader terbanyak dalam penelitian ini adalah ibu rumah tangga. Kader perempuan, terutama ibu rumah tangga, akan memiliki lebih banyak waktu untuk menjalankan tugasnya sebagai seorang kader kesehatan. Pendidikan terakhir didominasi lulusan SLTA, sehingga kader kesehatan di Desa Wisata Gabugan memiliki tingkat pendidikan yang cukup.

Melihat perbandingan hasil nilai *pre-test* dan *post-test* kader, terlihat adanya peningkatan nilai dari 7,470 menjadi 11,294. Peningkatan 3,823 ini lebih dari 50% nilai pretest awal. Setelah dianalisis menggunakan *Wilcoxon-test*, ditemukan bahwa nilai p = 0,000. Dengan begitu, tampak bahwa pelatihan kader memberikan dampak yang signifikan terhadap pengetahuan PIS-PK kader kesehatan sebagai dasar untuk mengembangkan Desa Wisata Gabugan menjadi sebuah desa wisata sehat. Beragam metode pelatihan terbukti dapat meningkatkan pengetahuan dan keterampilan kader kesehatan.[8]

Keberhasilan penggunaan metode pelatihan interaktif dengan melibatkan mahasiswa interprofesi terbukti dengan adanya peningkatan pemahaman kader terhadap program PIS-PK ini. Namun, tetap perlu dilakukan evaluasi jangka panjang di masa depan terkait implementasinya dalam pengembangan Desa Wisata Gabugan menjadi sebuah desa wisata sehat. Mengingat masih ada indikator yang memiliki cakupan

rendah di masyarakat, diharapkan dengan adanya pelatihan kader kesehatan ini, masyarakat akan mendapatkan sosialisasi bahaya-bahaya dari tidak terpenuhinya indikator-indikator tersebut. Selain itu, diharapkan kerja sama yang sudah terjalin tidak berhenti sampai pelatihan ini saja. Masih banyak aspek kesehatan lain yang dapat digali dari Desa Wisata Gabugan. Kegiatan berkelanjutan perlu dilakukan agar dapat memberikan manfaat lebih jauh, khususnya di Desa Wisata Gabugan.

Manfaat bagi mahasiswa interprofesi yang terlibat dapat dirasakan secara langsung. Pendidikan lebih tinggi mengajarkan orang untuk berpikir lebih logis dan rasional, serta dapat melihat sebuah isu dari berbagai sisi sehingga mahasiswa dapat melakukan analisis dan memecahkan suatu masalah. Selain itu, pendidikan tinggi memperbaiki keterampilan kognitif yang diperlukan untuk dapat terus belajar di luar sekolah.[9] Pengetahuan yang diperoleh bisa berasal dari pendidikan formal maupun informal. Pendidikan tinggi dapat mempromosikan hubungan dan mendukung secara merata karena membantu mahasiswa untuk memahami satu sama lain. Hal ini juga berlaku dalam aspek komunikasi interpersonal. Kemampuan komunikasi yang baik perlu dilatih agar mahasiswa dapat beradaptasi dengan lingkungan yang majemuk.[10] Penerjunan mahasiswa interprofesi ke masyarakat diharapkan dapat memberikan manfaat tersebut. Pendidikan interprofesional dapat meningkatkan kemampuan kolaborasi serta pengalaman nyata saat terjun ke masyarakat.[11] Perspektif pendidikan menunjukkan bahwa mahasiswa yang mengikuti program interprofesional memiliki persepsi, keterampilan, sikap dan kemampuan kerja sama tim yang mumpuni.[12] Meski demikian, pembelajaran interprofesional perlu dipersiapkan baik dalam hal teknis kegiatan maupun materi yang diberikan selama program berlangsung.[13]

Dukungan sosial dari kader dan mahasiswa diharapkan dapat memberikan efek kepada keluarga yang didampingi, khususnya untuk menurunkan depresi, kecemasan dan stres psikologis yang mempengaruhi kesehatan keluarga.[14,15] Dukungan sosial dapat juga diperoleh dari kebiasaan melakukan kegiatan sosial, yaitu melakukan kegiatan olahraga bersama, serta mengikuti gerakan anti merokok atau perkumpulan sebaya. Hal tersebut dapat dipromosikan untuk meningkatkan kesehatan keluarga.[16] Kegiatan yang telah dilakukan di Gabugan dapat meningkatkan ketahanan sosial masyarakat. Pemberdayaan yang dilakukan secara berkelanjutan mendorong penduduk sekitar mengubah tata nilai sosial, budaya dan lingkungan.[17] Uni Eropa, Inggris, Belanda dan Swedia telah membuat kemajuan yang signifikan dalam peningkatan tingkat kesehatan seluruh penduduknya dengan memperkenalkan paket kebijakan dan intervensi yang bersifat komprehensif. Paket kebijakan tersebut terutama ditekankan pada penanganan masalah pada faktor pendidikan, pekerjaan, dan pendapatan yang secara tidak langsung akan mendukung kesehatan dan kesejahteraan keluarga. Selaras dengan hal tersebut, Kementerian Kesehatan telah menerbitkan aturan legal dan formal sebagai dasar pelaksanaan program.[18] Selain itu, penggunaan sistem informasi dan teknologi dalam upaya pelayanan kesehatan komunitas juga telah terbukti memberikan manfaat yang signifikan.[19] Pengembangan teknologi yang sesuai dengan konteks sosial dan budaya masyarakat Indonesia menjadi tantangan di masa mendatang.

5. Kesimpulan

Keluarga di Desa Wisata Gabugan telah masuk dalam kategori keluarga pra sehat, dan pelatihan dengan melibatkan mahasiswa interprofesi kesehatan terbukti efektif meningkatkan pengetahuan kader PIS-PK. Namun ada beberapa hal yang perlu diperbaiki, yaitu indikator keluarga sehat yang cakupannya masih rendah. Pendampingan keluarga oleh kader dan mahasiswa diharapkan dapat berkelanjutan agar terwujud desa wisata sehat yang menjadi percontohan nasional.

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Konflik kepentingan

Penulis menyatakan tidak ada konflik kepentingan dengan pihak-pihak yang terkait dalam penelitian ini.

Daftar pustaka

1. Kementerian Kesehatan RI. Buku Monitoring dan Evaluasi PIS-PK. Vol. 1, Kemenkes RI. 2017. hal. 1–85.
2. Kementerian Perencanaan Pembangunan Nasional. Rencana Pembangunan Jangka Menengah Nasional 2015-2019. Jakarta: Kementerian Perencanaan Pembangunan Nasional; 2015.
3. Agni MGK. Kesiapan Daerah Istimewa Yogyakarta Dalam Penerapan Program Indonesia Sehat Dengan Pendekatan Keluarga. Jurnal Formil. 2018;3(1):1–5.
4. Laelasari E, Anwar A, Soerachman R. Evaluasi Kesiapan Pelaksanaan Program Indonesia Sehat dengan Pendekatan Keluarga. Jurnal Ekologi Kesehatan. 2017;16(2):57–72.
5. Cfhc Ipe Fkkmk Ugm. Cfhc-Ipe Buku Acuhan Umum Cfhc-Ipe. Yogyakarta: CFHC IPE; 2014.
6. Kementerian Kesehatan RI. Hasil Pendataan Keluarga Sehat dalam Aplikasi Keluarga Sehat. Web. 2017. hal. 1.
7. Kementerian Kesehatan RI. Buletin Jendela Data dan Informasi Kesehatan Penyakit Tidak Menular. Pusdatin K. Jakarta: Kementerian Kesehatan RI; 2012.
8. Triyanti M, Widagdo L, BM S. Peningkatan Pengetahuan dan Keterampilan Kader Pemantauan Tumbuh Kembang Balita di Posyandu dengan Metode BBM dan Mind Mapping. *Jurnal Promosi Kesehatan Indonesia*. 2017;12(2).
9. Laflamme L, Engström K, Möller J, Hallqvist J. Is perceived failure in school performance a trigger of physical injury? A case-crossover study of children in Stockholm County. *J Epidemiol Community Health*. 2004;58(5):407–11.
10. Suhanti IY, Puspitasari DN, Noorrizki RD. Keterampilan Komunikasi Interpersonal Mahasiswa UM. In: Seminar Nasional Psikologi Klinis 2018. Malang: Universitas Negeri Malang; 2018. hal. 37–9.
11. Mulyati L, Trimarliana M. Model Pendidikan Interprofesional Dalam Upaya Peningkatan Kemampuan Kolaboratif Mahasiswa Kesehatan. 2017;1–11.
12. Pratiwi DR, Adespin DA, Soeharto BP. Faktor Yang Berhubungan Dengan Kinerja Mahasiswa S-1 Pendidikan Dokter Universitas Diponegoro Dalam Pelaksanaan Kegiatan Interprofessional Education Tahun 2017. *Jurnal Kedokteran Diponegoro*. 2018;7(2):667–75.
13. Lisum K, Pasaribu J, Indiyah S. Efektivitas Modul Komunikasi Interprofesional Pada Mahasiswa Fakultas Kedokteran dan Keperawatan. *Jurnal Pendidikan Kedokteran Indonesia.* 2017;6(3):163–70.
14. Tse ADP, Suprojo A, Adiwidjaja I. Peran Kader Posyandu Terhadap Pembangunan Kesehatan Masyarakat. *Kesehatan Masyarakat*. 2017;6(1):60–2.
15. Chi N-C, Demiris G, Lewis FM, Walker AJ, Langer SL. Behavioral and Educational Interventions to Support Family Caregivers in End-of-Life Care: A Systematic Review. *Am J Hosp Palliat Car*e. 2016;33(9):894–908.
16. Kemenkes RI. Pedoman Umum Program Indonesia Sehat Dengan Pendekatan Keluarga Kementerian Kesehatan Republik Indonesia 2016. In 2016.
17. Andayani AAI, Martono E, Muhamad M. Pemberdayaan Masyarakat Melalui Pengembangan Desa Wisata Dan Implikasinya Terhadap Ketahanan Sosial Budaya Wilayah (Studi Di Desa Wisata Penglipuran Bali). *Jurnal*

Ketahanan Nasional. 2017;23(1):1.

18. Kementerian Kesehatan RI. Peraturan Menteri Kesehatan Nomor 36 Tahun 2016. Indonesia; 2016.
19. Masters K, Ellaway RH, Topps D, Archibald D, Hogue RJ. Mobile technologies in medical education: AMEE Guide No. 105. *Medical teacher*. 2016;38(6):537–49.

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Karakteristik limbah dan dampaknya bagi kesehatan pembatik di Lendah, Kulon Progo

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ABSTRAK Cat sintetis pewarna batik sering mengandung logam berat misalnya timbal (Pb), krom (Cr), silika (Si), dan HCl atau ion klorida (Cl^-). Pemakaian logam berat jangka lama akan mengganggu kesehatan terutama bagi pembatik dan lingkungannya. Tujuan penelitian ini adalah untuk mengetahui karakteristik limbah dan dampaknya bagi kesehatan pembatik di Lendah, Kulon Progo**.** Subjek penelitian ini adalah 76 pembatik di tiga sentra batik, terdiri dari 37 orang dari SB, 20 orang dari FA, dan 19 orang dari SA. Pada responden dilakukan pemeriksaan kesehatan serta wawancara mengenai dampak limbah dan keluhan penyakit yang dialami menggunakan kuesioner. Sampel darah sebanyak 5 ml diambil dan diperiksa kadar hemoglobin (Hb), *packed cell volume* (PCV), gula darah, dan kolesterol totalnya. Plasma darah dan air limbah diperiksa kadar Pb dan Cr-nya dengan metode *inductively coupled plasma* (ICP); kadar Si-nya dengan *atomic absorption spectrofotometry* (AAS); dan kadar Cl^--nya dengan spektrofotometri. Gangguan kognitif diperiksa dengan *mini–mental state examination* (MMSE), sedangkan neuropati perifer diperiksa dengan skor *diabetic neuropathy symptom* (DNS). Hasil yang diperoleh dianalisis dengan analisis varian dan t-test. Hubungan Pb dan Cr dengan gangguan kognitif dianalisis dengan uji korelasi. Kadar kolesterol total dan gula darah dianalisis secara deskriptif. Tidak terdapat perbedaan pengetahuan tentang dampak limbah pada pembatik di tiga sentra batik. Kadar Pb, Cr, dan HCl di tiga sentra batik tidak berbeda bermakna ($p > 0,05$), sedangkan kadar Si dalam darah pembatik di tiga sentra berbeda bermakna ($p < 0,05$). Tidak terdapat hubungan antara kadar Pb dan Cr darah dengan gangguan kognitif berdasarkan skor MMSE dan kejadian neuropati perifer berdasarkan skor DNS ($p > 0,05$). Kadar kolesterol normal (< 200 mg/dL) dijumpai pada 70,0-80,5% pembatik, sedangkan kadar glukosa darah normal (< 200 mg/dL), dijumpai pada 85,0-95,1% pembatik. Kadar Si darah di tiga sentra batik menunjukkan perbedaan yang bermakna. Keluhan yang banyak dirasakan adalah nyeri sendi dan pusing. Tidak terdapat hubungan antara kadar Pb dan Cr darah dengan gangguan kognitif. Kadar kolesterol total pada pembatik cenderung tinggi.

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KATA KUNCI klorida; krom; pembatik; plumbum; silika

ABSTRACT *Synthetic batik coloring often uses heavy metals element such as lead (Pb), chromium (Cr), silica (Si), and hydrochloric acid (HCl). The exposure of heavy metals in long period results in health impair on the artisans and eventually harming the environment. The purpose of this research is to analyze the waste characteristics and health impact towards the artisans in the Lendah, Kulon Progo. Seventy-six batik artisan, consisting of 37 from SB, 20 from FA, and 19 from SA underwent 5 ml blood sampling. The samples were used to determine their hemoglobin (Hb) level, packed cell volume (PCV), blood sugar, and total cholesterol. Blood plasma and wastewater were examined for Pb and Cr using the inductively coupled plasma (ICP) method; Si using atomic absorption spectrophotometry (AAS); and Cl- using spectrophotometry. Respondents underwent health checks and were interviewed about the impact of waste and disease complaints experienced using a questionnaire. Cognitive disorders were examined using mini-mental state examination (MMSE) and peripheral neuropathy was assessed using diabetic neuropathy symptom (DNS) score. The results obtained were analyzed by analysis of variance and t-test. Correlation test was used to examine the relationship of Pb and Cr with cognitive disorders. Total cholesterol levels and blood sugar were analyzed descriptively. There is no difference in knowledge about waste in batik makers in SB, FA, and SA. The level of Pb, Cr, and Cl^- within the three production centers showed no significant difference ($p > 0,05$), whilst Si level showed significant difference between centers ($p < 0,05$). There is no correlation between Pb and Cr blood levels with cognitive impairing according to MMSE and occurence of peripheral neuropathy according to DNS score ($p > 0.05$). Normal cholesterol levels (< 200mg/dL) and normal blood glucose levels (< 200 mg/dL) were observed in 70.0-80.5% and 85.0-95.1% batik artisans, respectively. Si levels in all three production centers' waste shows significant difference. The most frequent complaint was back pain and dizziness. There is no correlation caused by Pb and Cr levels toward cognitive impairing. Cholesterol level in batik artisans tended to be high.*

KEYWORDS *batik artisan; chloride; chromium; lead; silica*

1. Pendahuluan

Berbagai wilayah di Indonesia telah memiliki banyak usaha mikro kecil menengah (UMKM) batik yang mengembangkan motif batik sesuai dengan kondisi wilayah masing-masing yangdijadikan sebagai identitas daerah, salah satunya adalah di Kabupaten Kulon Progo. Pada tahun 2015 terdapat 108 industri batik di Kulon Progo.[1] Produk lokal batik semakin terangkat sejak diluncurkannya motif Geblek Renteng sebagai batik identitas Kulon Progo dan program Bela dan Beli Kulon Progo pada tahun 2013.[2] Lendah merupakan salah satu daerah di Kulon Progo yang memiliki UMKM kerajinan batik yang berkembang pesat.

Pewarnaan batik merupakan salah satu tahapan dalam proses pembuatan batik. Untuk mendapatkan warna yang bagus, lebih terang dan jelas diperlukan timbal (Pb), krom (Cr), silika (Si) dan ion klorida (Cl^-). Penggunaan bahan pewarna sintetik untuk batik kini meluas karena selain harganya yang terjangkau, juga tersedia pilihan warna yang lebih banyak yang sangat mendukung pengembangan motif dan corak batik. Dampak penggunaan pewarna tersebut adalah meningkatnya paparan pembatik terhadap logam berat seperti Pb, Cr, Si dan Cl^-. Umumnya limbah batik akan langsung dibuang ke sungai melalui drainase air hujan. Industri batik merupakan industri yang berpotensi menghasilkan limbah berbahaya mengandung logam berat yang dapat menyebabkan kerusakan lingkungan dan memberikan dampak negatif pada kesehatan.[3,4]

Gejala toksisitas kronis logam berat sering diabaikan, meskipun pada akhirnya dapat menimbulkan kerusakan berbagai organ. Gangguan neurologi merupakan salah satu efek dari paparan logam berat terutama Pb dan Cr. Upaya pencegahan untuk meminimalisir efek toksisitas

dengan menggali pengetahuan pembatik tentang limbah, deteksi dini terdapatnya Pb, Cr, Si, dan Cl^- pada populasi berisiko, dan diikuti oleh program berkelanjutan sebagai upaya pencegahan yang utama perlu dilakukan.[5,6]

Paparan dapat terjadi tergantung sifat logam berat. Si dan Cl^- dapat masuk ke dalam tubuh melalui inhalasi, sedangkan Pb dan Cr dapat masuk melalui kulit. Setelah terserap, Pb akan terdistribusi ke jaringan lunak (darah, hati, paru-paru, limpa, ginjal, dan sumsum tulang) atau ke tulang. Masa paruh biologis Pb sekitar 16-40 hari dalam darah dan sekitar 17–27 tahun pada tulang. Pb diperkirakan bertanggung jawab atas 0,9% dari total beban penyakit global karena efek paparan Pb. Indikator umum keracunan Pb anorganik pada manusia adalah kandungan Pb dalam darah. Kadarnya masih dianggap aman dalam kisaran 0,2-0,8 ppm. Namun, kadar aman dalam darah manusia sudah sangat dekat dengan batas toksik.[3,4]

Pb sangat memengaruhi sistem saraf pusat. Tanda-tanda keracunan akut Pb misalnya mudah lelah, mudah mengantuk, lekas marah, sakit kepala, tremor otot, halusinasi, dan kehilangan ingatan.[7] Ensefalopati terjadi apabila kadar Pb darah 100-120 ug/dL pada orang dewasa dan 80-100 µg/dL pada anak-anak.[8]

Pemakaian Cr pada industri logam memberikan kekuatan dan ketahanan terhadap korosi. Cr juga digunakan pada bahan samak, pigmen cat, dan katalis untuk impregnasi kayu atau fotografi.[8,9] Logam Cr trivalen (Cr III) merupakan elemen penting dalam nutrisi manusia. Cr valensi VI bersifat karsinogenik dan dalam kadar rendah dapat mengiritasi kulit. Paparan kronisnya dapat menyebabkan kerusakan ginjal dan hati, serta dapat merusak jaringan sirkulasi dan saraf.[10]

Si yang terhirup akan mengakibatkan silikosis, bronkitis, atau kanker paru.[11] Apabila terhirup terus-menerus akan mengganggu dan mengurangi kapasitas paru serta akan menyebabkan iritasi pada paru dan selaput lendir. Kristal Si juga dapat mengiritasi kulit dan mata.[12] HCl dengan konsentrasi pekat bisa menimbulkan kabut asam. Si dan HCl memiliki sifat yang korosif terhadap jaringan tubuh dan berpotensi menimbulkan kerusakan di beberapa organ tubuh seperti mata, kulit, usus, serta organ pernafasan.

Melihat adanya kerentanan pembatik terhadap paparan logam berat yang dapat berdampak pada kesehatan, penelitian ini dilakukan untuk mengetahui karakteristik limbah dan dampaknya terhadap kesehatan pembatik di Lendah Kulon Progo.

2. Metode

Desain pada penelitian ini adalah *cross-sectional.* Penelitian dilakukan di tiga sentra batik di Kecamatan Lendah, Kulon Progo. Populasi pada penelitian ini adalah semua karyawan batik di tiga sentra batik, yaitu SB, FA, dan SA yang bersedia mengikuti penelitian. Teknik pengambilan sampel dilakukan dengan *consecutive sampling*, yaitu mengambil semua subyek di lokasi tertentu. Seluruh subjek mengisi dan menandatangani *informed consent*. Pengambilan sampel penelitian disesuaikan dengan kriteria inklusi dan ekslusi yang telah ditetapkan. Kriteria inklusi pada penelitian ini adalah semua pembatik laki-laki maupun perempuan di tiga sentra batik SB, FA dan SA yang bersedia mengikuti penelitian. Kriteria ekslusi pada penelitian ini adalah pembatik yang menyandang diabetes melitus, *stroke* dan penyakit saraf lainnya.

Untuk mengetahui karakteristik limbah dan dampaknya bagi kesehatan pembatik, dilakukan penggalian pengetahuan pembatik tentang dampak limbah, pemeriksaan kadar Pb, Cr, Si dan Cl^- dalam darah dan limbah, anamnesis gejala klinis (keluhan yang dirasakan terkait paparan Pb, Cr, Si dan Cl^-), pemeriksaan gangguan kognitif, serta pemeriksaan kadar gula darah sesaat dan kolesterol total.[13]

Sampel yang diperiksa sebanyak 76 orang pembatik di Kecamatan Lendah, Kulon Progo, yang berasal dari tiga sentra batik, yaitu SB (37 orang), FA (20 orang) dan SA (19 orang). Setelah subjek menandatangani *informed consent*, darah diambil sebanyak 5 ml dan dilakukan pemeriksaan kadar Hb (anemia jika pada laki-laki <13 g/dl dan perempuan

12 g/dl),[13] PCV, gula darah sesaat (normal apabila <200 mg/dl),[14] kolesterol total (normal apabila <200 mg/dl)[15] di Laboratorium Penelitian dan Pengujian Terpadu Universitas Gadjah Mada (LPPT UGM). Kadar Pb dan Cr pada plasma darah dan air limbah diperiksa dengan metode *inductively coupled plasma* (ICP) di LPPT UGM. Kadar Si diperiksa menggunakan *atomic absorption spectroscopy* **(**AAS) dan Cl^- menggunakan spektrofotometri di Laboratorium Kimia MIPA UGM.

Subjek diwawancarai menggunakan kuesioner tentang dampak limbah dan gejala penyakit berdasarkan keluhan yang diperkirakan berhubungan dengan toksisitas akibat paparan logam Pb, Cr, Si, dan HCl. Gejala penyakit yang dirasakan berupa gejala iritasi mata yakni mata berair, pedih dan gatal; gejalan gangguan nafas yakni sesak nafas; dan gejala gangguan kulit yakni gatal dan kemerahan. Dilakukan juga pemeriksaan antropometrik meliputi berat badan, tinggi badan, dan tekanan darah. Kriteria tekanan darah normal yang dipakai dalam penelitian ini adalah kriteria dari *The Eight Joint National Commitee* (*JNC 8)* sesuai usia sebagai berikut: ≥ 60 tahun sistole < 150, diastole <90; < 60 tahun sistole < 140, diastole <90; > 18 tahun dengan *chronic kidney disease* (CKD) sistole < 140, diastole <90; dan > 18 tahun dengan diabetes sistole < 140, diastole <90.[16]

Gangguan kognitif diperiksa dengan *mini-mental state examination* (MMSE) yang berisi 5 domain fungsi kognitif yaitu registrasi, orientasi, bahasa, *recall*, atensi dan kalkulasi.[17] Kriteria gangguan kognitif yang digunakan sesuai dengan Panduan Penatalaksanaan Demensia Perhimpunan Dokter Spesialis Saraf Indonesia (PERDOSSI).[18] Subjek dinilai memiliki gangguan kognitif apabila nilai pemeriksaan MMSE kurang dari 27.[19] Kejadian neuropati perifer diperiksa dengan skor *diabetic neuropathy symptom* (DNS)[20] dan *diabetic neuropathy examination* (DNE).[21]

Normalitas data diuji dengan uji Saphiro-Wilk dan dilakukan transformasi data apabila data tidak normal. Apabila masih tidak normal, data dianalisis menggunakan uji non-parametrik. Hasil yang diperoleh dari ketiga lokasi dibandingkan satu sama lain dengan analisis varian untuk uji parametrik dan Kruskal-Wallis untuk uji non-parametrik dilanjutkan dengan uji *post-hoc* Tukey untuk uji parametrik dan Mann Whitney untuk uji non-parametrik. Uji korelasi dilakukan untuk melihat hubungan antara kadar Pb dan Cr dengan gangguan kognitif. Interval kepercayaan yang dipakai 95% sehingga nilai p < 0,05 dinyatakan bermakna secara statistik. Hasil pemeriksaan kolesterol total dan gula darah sesaat, dianalisis secara deskripitf. Protokol penelitian ini telah mendapatkan kelaikan etik dari Komisi Etik Fakultas Kedokteran Kesehatan Masyarakat, dan Keperawatan Universitas Gadjah Mada (FK-KMK UGM), dengan nomor KE/FK/0830/EC/2018.

3. Hasil

Nilai rata-rata pengetahuan pembatik tentang limbah secara keseluruhan adalah 6,58 dan tidak ada perbedaan bermakna secara statistik di antara tiga sentra batik (p > 0,05), namun pengetahuan tentang limbah antara pembatik di SB dan FA menunjukkan perbedaan yang bermakna. Data tampak pada Tabel 1.

Pembatik di SB sebagian besar perempuan

Tabel 1. Nilai pengetahuan tentang limbah pada pembatik di SB, FA, dan SA

Keterangan	SB	FA	SA	Nilai p
Mean±SD	7,5±3,5	5,5±2,4	6,5±3,1	0,074
SB - FA	7,5±3,5	5,5±2,4		0,026*
SB - SA	7,5±3,5		6,5±3,1	0,563
FA - SA		5,5±2,4	6,5±3,1	0,152

SD: standar deviasi; SB, FA, dan SA adalah inisial sentra-sentra batik. Data dinyatakan dalam mean ± SD. *Bermakna secara statistik (p<0.05).

Tabel 2. Data karakteristik pembatik dan limbah di SB, FA, dan SA

Karakteristik	SB	FA	SA	Nilai P
Laki-laki, n (%)	12 (32,4)	18 (90,0)	10 (52,6)	
Perempuan, n (%)	25 (67,6)	2 (10,0)	9 (47,4)	
Total, n (%)	37 (100,0)	20 (100,0)	19 (100,0)	
Umur (th), mean ± SD	42,9 ± 14,4	45,5 ± 9,3	44,6 ±11,7	0,163[1]
Berat badan (kg), mean ± SD	54,5 ± 7,4	56,6 ± 9,0	59,2 ±9,5	0,226[1]
Tinggi Badan (cm), mean ± SD	164,6 ± 7,8	153,7 ± 6,2	159,2 ± 9,0	0,274[1]
IMT (kg/m^2), mean ± SD	28,3 ± 3,5	23,9 ± 3,3	25,9 ± 2,5	0,155[1]
Sistole (mmHg), mean ± SD	122,9 ± 22,9[a]	131,2 ±15,6[a]	122,6 ± 23,3	0,550[2]
Diastole (mmHg), mean ± SD	78,1 ± 13,5	86,7 ± 9,5	85,3 ± 9,0	0,211[1]
Hb (g/dL), mean ± SD	13,3 ± 2,3[a]	14,2 ± 2,9	14,6 ± 1,8[a]	0,078[1]
PCV, mean ± SD	39,4 ± 6,7	41,1 ± 7,0	42,1 ± 4,7	0,398[1]
Pb darah (µg/dL), mean ± SD	77 ± 40[a]	82 ± 28[b]	52 ± 24[a,b]	0,082[1]
Cr darah (µg/dL), mean ± SD	33 ± 41[a]	33 ± 19	15 ± 8[a]	0,064[1]
Si darah (ppm), mean ± SD	383,3 ± 123,9	686,7±231,3	529,0±434,6	0,000*
Pb limbah(µg/dL), mean ± SD	28,1 ± 17,1	18,1 ± 14,7	35,8 ± 14,2	0,338[1]
Cr limbah (µg/L), mean ± SD	< 0,12	< 0,12	< 0,12	1,000[1]
Si limbah (ppm), mean ± SD	155,9±1667,7	194,5±20,5	225,6±42,5	0,173[1]
Cl^-limbah (ppm) , mean ± SD	847,7±825,7	179,7±72,9	539,2±767,6	0,482[1]

SD: standar deviasi; IMT: indeks massa tubuh; SB, FA, dan SA adalah inisial sentra-sentra batik. [1]Uji One-Way ANOVA. [2]Uji Kruskal-Wallis. *Bermakna secara statistik (p < 0.05). Rerata sistol dengan *superscript* sama tidak berbeda signifikan secara statistik antar keduanya (Mann Whitney U, p < 0.05). [a,b]*Supercript* yang sama dalam baris yang sama menujukkan perbedaan yang bermakna.

Tabel 3. Gejala-gejala yang dirasakan serta hasil pemeriksaan tekanan darah dan Hb para pembatik di Lendah, Kulon Progo

Variabel	SB** n = 37	FA** n = 20	SA** n = 19	Total* n=76
Gangguan kulit, n (%)	10 (27)	9 (45)	9 (47)	28 (37)
Gangguan nafas, n (%)	12 (32)	1 (5)	4 (21)	17 (22)
Nyeri sendi, n (%)	14 (38)	16 (80)	7(37)	37 (49)
Iritasi pada mata, n (%)	5 (14)	6 (30)	4 (21)	15 (20)
Pusing, n (%)	13 (35)	12 (60)	12 (63)	37 (49)
Hipertensi, n (%)	9 (24)	10 (50)	3 (16)	22 (29)
Anemia, n (%)	3 (8)	4 (20)	1 (5)	8 (11)

SB, FA, dan SA adalah inisial sentra-sentra batik. *Persentase menunjukkan jumlah subjek yang mengalami gejala dibandingkan dengan total jumlah subjek penelitian. **Persentase menunjukkan jumlah subjek yang mengalami gejala per lokasi dibandingkan dengan total jumlah subjek yang merasakan gejala.

Tabel 4. Karakteristik subjek dan hasil pemeriksaan gangguan kognitif dengan MMSE

Karakteristik	n (%)
Jenis Kelamin	
Laki-laki	10 (14)
Perempuan	32 (76)
Usia	
17 – 54 tahun	38 (90)
> 55 tahun	4 (10)
Skor MMSE	
27 – 30 (normal)	7 (17)
21 – 26 (mild)	28 (66)
11 – 20 (moderate)	7 (17)
0 – 10 (severe)	0 (0)

MMSE: Mini-mental state examination

(67,6%), sedangkan di FA mayoritas laki-laki (90,0%). Hasil pemeriksaan antropometrik, tekanan darah, kadar Hb, Pb, Cr, Si, dan Cl^- darah serta limbah dari ketiga sentra batik di Lendah, Kulon Progo, ditunjukkan dalam Tabel 2.

Secara statistik data antropometrik pembatik di tiga sentra batik tidak menunjukkan perbedaan bermakna, demikian juga kadar Pb, Cr, Si, dan Cl^- pada limbah dan darah, namun kadar Si pada darah menunjukkan perbedaan yang bermakna. Kadar Hb antara pembatik di SB dan SA, menunjukkan perbedaan yang bermakna, demikian juga kadar Pb darah antara pembatik di SB dan SA, dan antara pembatik di FA dan SA. Kadar Cr darah antara pembatik di SB dan SA secara statistik juga menunjukkan perbedaan yang bermakna.

Gejala yang dirasakan oleh pembatik di Lendah, mayoritas nyeri sendi dan pusing (49% dari total pembatik). Pembatik FA paling sering merasakan gejala nyeri sendi (80%), sedangkan pusing paling banyak dikeluhkan (63%) oleh pembatik SA. Padapemeriksaan tekanan darah, 10 dari 20 (50%) pekerja yang diperiksa di sentra FA mengalami hipertensi (sistole ≥140 mmHg atau diastole ≥ 90 mmHg) dan 20% pembatik memiliki kadar Hb rendah (≤12 mg/dL). Gejala-gejala yang dirasakan pembatik serta hasil pemeriksaan darah dan Hb disajikan dalam Tabel 3.

Hanya 42 orang dari jumlah total 76 orang dapat diperiksa dengan MMSE karena pemeriksaan MMSE tidak bisa dilakukan pada responden dengan pendidikan formal <3 tahun dan yang tidak kooperatif. Analisis regresi logistik menunjukkan tidak terdapat korelasi antara kadar Pb darah dan kejadian gangguan kognitif(p = 0,058; CI 95%). Kadar Cr dalam darah juga tidak berkorelasi dengan kejadian gangguan kognitif (p = 0,079; CI 95%). Karakteristik subjek yang diperiksa gangguan kognitifnya disajikan pada Tabel 4.

Dari 42 subjek tersebut, sistem skoring DNS mendiagnosis neuropati perifer pada 19 subjek (45%) sedangkan sistem skoring DNE mendiagnosis kelainan tersebut pada 2 subjek (5%). Analisis regresi logistik menunjukkan tidak terdapat korelasi antara kadar Pb darah dan kejadian neuropati perifer berdasarkan sistem skoring DNS (p = 0,964; CI 95%) maupun sistem skoring DNE (p = 0,116; CI 95%). Analisis regresi logistik juga menunjukkan tidak terdapat korelasi antara kadar Cr darah dan kejadian neuropati perifer berdasarkan sistem skoring DNS (p = 0,283; CI 95%) maupun sistem skoring DNE (p = 0,180; CI 95%).

Sebagian besar pembatik mempunyai kadar kolesterol total dan gula darah sesaat dalam batas normal, namun secara keseluruhan kadar kolesterol yang tinggi lebih banyak dijumpai pada pembatik, dibanding kadar gula darah yang tinggi. Hasil pemeriksaan gula darah sesaat dan kolesterol total di tiga sentra batik di Lendah, Kulon Progo ditunjukkan dalam Tabel 5.

4. Pembahasan

Nilai rata-rata pengetahuan tentang dampak limbah pada pekerja batik relatif rendah. Hal ini disebabkan karena sebagian besar responden adalah pembatik yang kadang membatik di rumah masing-masing (tidak di pabrik) serta tidak berperan dalam proses pengolahan batik, baik pewarnaan, penguncian warna, pelorotan, pengecapan, maupun pencucian. Pengetahuan yang rendah mengenai dampak limbah menandakan belum mengertinya pekerja batik terhadap bahaya toksisitas limbah batik terhadap kesehatan. Hal ini perlu diperhatikan karena masih dijumpai pembatik yang tidak

Tabel 5. Frekuensi subjek dengan kadar gula darah dan kolesterol total yang normal dan tidak normal di SB, FA dan SA

Variabel	SB		FA		SA	
	Normal n (%)	Tidak Normal n (%)	Normal n (%)	Tidak Normal n (%)	Normal n (%)	Tidak Normal n (%)
Gula darah sesaat	39 (95)	3 (5)	18 (90)	2 (10)	17 (85)	3 (15)
Kolesterol total	33 (80)	8 (20)	14 (70)	6 (30)	13 (70)	6 (30)

Gula darah sesaat, normal (≤200 mg/dl), tidak normal (>200mg/dl); kolesterol total, normal (≤200 mg/dl), tidak normal (>200 mg/dl)

menggunakan alat pelindung diri secara optimal sehingga membahayakan kesehatan diri. Perlu dilakukan sosialisasi penggunaan alat pelindung diri dan kaitannya dengan dampak kesehatan.

Pada penelitian ini, skoring MMSE dilakukan secara keseluruhan gangguan tiap domain. Hasil skoring MMSE tidak dihubungkan dengan usia pada penelitian ini. Hasil penelitian ini menunjukkan tidak ada korelasi antara kadar Pb darah dan kejadian gangguan kognitif berdasarkan skor MMSE. Hal ini berbeda dengan studi yang dilakukan oleh Harbani yang menemukan adanya korelasi antara kadar Pb darah dengan gangguan kognitif pada domain bahasa, registrasi, dan visuospasial.[22]

Hasil penelitian ini juga menunjukkan tidak ada korelasi antara kadar Cr dalam darah dengan kejadian gangguan kognitif. Studi khusus mengenai kadar Cr yang dihubungan dengan gangguan kognitif masih belum banyak dilakukan. Studi yang dilakukan oleh Green *et al.* menemukan hubungan antara tingginya kadar Cr dalam darah pada pasien dengan *metal-on-metal hip implant* di Inggris tahun 2003 – 2011 dengan gangguan neuropsikiatri yang di nilai dengan *back depression inventory* (BDI) dan MMSE. [23]

Hasil penelitian ini menunjukkan tidak terdapat korelasi antara kadar Pb darah dan kejadian neuropati perifer berdasarkan sistem skoring DNS maupun sistem skoring DNE. Hal ini berbeda dengan studi yang dilakukan oleh Mochammad *et al.* yang menemukan korelasi positif berkekuatan sedang antara kadar Pb darah dan neuropati perifer yang diukur dengan kriteria *modified total neuropathy score* (mTNS) pada petugas stasiun pengisian bahan bakar untuk umum (SPBU).[19] Penelitian tersebut melaporkan sebanyak 5 (9%) dari total 55 subjek memiliki kadar Pb darah yang tinggi, yaitu di atas 25 µg/dl. [19] Kandungan Pb darah yang tinggi juga ditemukan pada penelitian oleh Shobha *et al.* yang mendapati semua subjeknya mengalami *wrist drop* dan *finger drop* tanpa disertai gejala sensorik pada kadar timbal antara 37,8-107,8 µg/dl.[24] Temuan tersebut tidak didapatkan dalam penelitian ini. Kadar tertinggi Pb darah pada subjek yang memenuhi kriteria inklusi dan eksklusi ialah 1,68 µg/dl sehingga masih dalam batas aman yang direkomendasikan oleh *Center for Disease Control and Prevention* (CDC), yaitu di bawah 10 µg/dl.[25]

Hasil penelitian ini juga menunjukkan tidak terdapat korelasi antara kadar Cr darah dan kejadian neuropati perifer berdasarkan sistem skoring DNS maupun sistem skoring DNE. Studi mengenai pengaruh paparan kromium terhadap sistem saraf pada manusia belum banyak dilakukan. Penelitian oleh Kitamura *et al.* menunjukkan skor *olfactory recognition tresholds* pada pekerja pabrik terpapar Cr lebih tinggi secara bermaknsa dibandingkan kontrol serta berkorelasi positif dengan lama paparan. Konsentrasi Cr di udara pada penelitian tersebut bervariasi antara 0,005-0,03 mg/m^3 untuk kromium(VI) dan antara 0,005-0,06 mg/m^3 untuk kromium(III).[26] Penelitian pada hewan coba juga belum menemukan batas yang jelas untuk menentukan kadar Cr darah yang berpotensi memberikan efek toksik terhadap sistem saraf.

Penelitian oleh Kim *et al.* tidak mendapati adanya lesi pada otak tikus CDF jantan dan betina yang terpapar 30 mg/m^3 kromium (III) dalam bentuk kromium oksida atau kromium sulfat biasa selama tiga bulan.[27] Studi serupa oleh Derelanko *et al.* juga tidak menemukan lesi otak pada tikus Sprague-Dawley jantan yang terpapar 1,15 mg/m^3 Cr (VI) dalam bentuk kromium trioksida selama tiga bulan.[28]

Ketika penyerahan hasil laboratorium kadar gula darah sesaat dan kolesterol total pada pembatik, subjek diberi informasi untuk tetap menjaga kesehatan dan pola makan serta anjuran pemeriksaan lebih lanjut bagi pembatik yang nilai gula darah dan kolesterolnya melebihi batas normal. Kelemahan penelitian ini adalah gejala yang ditemukan merupakan gejala yang dirasakan pada saat pemeriksaan sehingga tidak bisa menghubungkan langsung toksisitas logam berat dengan gejala, serta jumlah sampel yang sedikit.

5. Kesimpulan

Kadar Pb, Cr, dan HCl pada limbah dan darah pembatik di tiga sentra batik tidak menunjukkan perbedaan bermakna, sedangkan kadar Si pada darah menunjukkan perbedaan yang bermakna. Keluhan yang banyak dirasakan adalah nyeri sendi dan pusing. Tidak terdapat hubungan antara kadar Pb dan Cr darah dengan gangguan kognitif. Kadar kolesterol pada pembatik cenderung tinggi.

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Konflik kepentingan

Penelit menyatakan tidak ada konflik kepentingan di antara peneliti dan pemberi dana penelitian.

Daftar pustaka

1. Pahlevy N, Sudiarso A. Analisis kelayakan batik cap pewarna campuran (Alami-sintesis) (Studi kasus di Batik Yoga, Gulurejo, Lendah, Kulon Progo) [Thesis]. Yogyakarta; Universitas Gadjah Mada; 2016.
2. Susilo EG, Rijanta R. Kajian implementasi "Bela-beli Kulon Progo"(Kasus: Air-ku, Batik Geblek Renteng, dan Tomira). Jurnal Bumi Indonesia. 2017;6(3).
3. Riwayati I, Hartati I, Purwanto H, Kimia ST. Adsorpsi logam berat timbal dan kadmium pada limbah batik menggunakan biosorben pulpa kopi terxanthasi. InProdising Seminar Nasional Aplikasi Sains & Teknologi (SNAST) 2014 2014 (pp. 1-8).
4. Sasongko DP, Tresna WP. Identifikasi unsur dan kadar logam berat pada limbah pewarna batik dengan metode analisis pengaktifan neutron. Jurnal Ilmu Pengetahuan dan Teknologi TELAAH. 2010;27:22-7.
5. Mason LH, Harp JP, Han DY. Pb neurotoxicity: neuropsychological effects of lead toxicity. BioMed research international. 2014;2014.
6. Chen P, Miah MR, Aschner M. Metals and neurodegeneration. F1000Research. 2016;5.
7. Velickova N, Kamcev N. Genotoxicological effects of heavy metals on humans cells. American Journal of Environmental Protection. 2014;2(4):71-3.
8. Naja GM, Volesky B. Toxicity and sources of Pb, Cd, Hg, Cr, As, and radionuclides in the environment. Heavy metals in the environment. 2009 Jun 23;8.
9. Burk RF, Prasad AS, Oberleas D. Trace elements in human health and disease. Vol. II, Academic Press, New York. 1976:105.
10. Rao DL. Heavy metals causing toxicity in humans, animals and environment. JCHPS. 2014;3:172-4.
11. Ilmiawati C, Reza M, Russilawati R. Edukasi pencegahan penyakit paru akibat paparan debu silika pada pengrajin batu akik di Kota Padang. LOGISTA-Jurnal Ilmiah Pengabdian kepada Masyarakat. 2017 Jun 30;1(1):1-0.
12. Yuarsa TA. Pengaruh debu vulkanik pada erupsi gunung berapi DIY terhadap kesehatan paru.

Jurnalis: Jurnal Lingkungan dan Sipil. 2019 Mar 15;2(1):51-64.

13. Hastuti P, Sunarti S, Prasetyastuti P, Ngadikun N, Tasmini T, Rubi DS, Sutarni S, Harahap IK, Dananjoyo K, Suhartini S, Pidada IB. Hubungan timbal dan krom pada pemakaian pewarna batik dengan kadar hemoglobin dan packed cell volume pada pengrajin batik di Kecamatan Lendah Kulon Progo. Journal of Community Empowerment for Health.2018;1(1):28-35.
14. American Diabetes Association. 2. Classification and diagnosis of diabetes: standards of medical care in diabetes—2018. Diabetes care. 2018 Jan 1;41(Supplement 1):S13-27.
15. Grundy SM, Stone NJ. Cholesterol clinical practice Guidelines AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA guideline on the management of blood cholesterol: a report of the American College of Cardiology/American heart association task force on clinical practice guidelines. Circulation. 2018(Nov).
16. Hernandez-Vila E. A review of the JNC 8 blood pressure guideline. Texas Heart Institute Journal. 2015 Jun;42(3):226-8.
17. Harahap HS, Rianawati SB. The profile of cognitive function of patients HIV/AIDS In Dr. Saiful Anwar Malang Hospital. Malang Neurology Journal. 2015 Jan 1;1(1):1-6.
18. Ong PA, Rambe AS, Widjojo FS, Laksmidewi AA. Panduan Praktik klinik diagnosis dan penatalaksanaan demensia. Jakarta: Perhimpunan Dokter Spesialis Saraf Indonesia. 2015.
19. Mochammad I, Sutarni S, Dahlan P. Korelasi antara kadar timbal dalam darah dengan neuropati perifer pada petugas stasiun pengisian bahan bakar untuk umum [Doctoral dissertation]. Yogyakarta; Universitas Gadjah Mada;2012.
20. Meijer, J.W.G., Smit, A.J., Sonderen, E.V., Groothoff, J.W., Eisma, W.H. and Links, T.P., 2002. Symptom scoring systems to diagnose distal polyneuropathy in diabetes: the Diabetic Neuropathy Symptom score. *Diabetic Medicine*, *19*(11), pp.962-965.
21. Meijer JW, van Sonderen E, Blaauwwiekel EE, Smit AJ, Groothoff JW, Eisma -WH, Links TP. Diabetic neuropathy examination: a hierarchical scoring system to diagnose distal polyneuropathy in diabetes. Diabetes Care. 2000 Jun 1;23(6):750-3.
22. Harbani N, Sutarni S, Wibowo S. Korelasi antara kadar plumbum dalam darah dengan neuropati perifer pada petugas stasiun pengisian bahan bakar umum Kotamadya Yogyakarta [Doctoral dissertation]. Yogyakarta; Universitas Gadjah Mada; 2012.
23. Green B, Griffiths E, Almond S. Neuropsychiatric symptoms following metal-on-metal implant failure with cobalt and chromium toxicity. BMC psychiatry. 2017 Dec;17(1):33.
24. Shobha N, Taly AB, Sinha S, Venkatesh T. Radial neuropathy due to occupational lead exposure: Phenotypic and electrophysiological characteristics of five patients. Annals of Indian Academy of Neurology. 2009 Apr;12(2):111.
25. Center for Disease Control and Prevention. Very high blood lead levels among adults — United States, 2002–2011 [Internet]. Cdc.gov; 2018 [diakses pada 22 Oktober 2018]. Tersedia di: https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6247a6.ht
26. Kitamura F, Yokoyama K, Araki S, Nishikitani M, Choi JW, Yum YT, Park HC, Park SH, Sato H. Increase of olfactory threshold in plating factory workers exposed to chromium in Korea. Industrial health. 2003;41(3):279-85.
27. Kim HY, Lee SB, Jang BS. Subchronic inhalation toxicity of soluble hexavalent chromium trioxide in rats. Archives of toxicology. 2004 Jul 1;78(7):363-8.
28. Derelanko MJ, Rinehart WE, Hilaski RJ, Thompson RB, Löser E. Thirteen-week subchronic rat inhalation toxicity study with a recovery phase of trivalent chromium compounds, chromic oxide, and basic chromium sulfate. Toxicological sciences: an official journal of the Society of Toxicology. 1999 Dec 1;52(2):278-88.

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Perbandingan kadar merkuri, kreatinin, dan urea pada pekerja industri di Kotagede dan Banguntapan, Yogyakarta sebagai indikator pencemaran

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ABSTRAK Kantor Pengendalian Dampak Lingkungan Kota Yogyakarta, mengindikasikan bahwa di Kecamatan Kotagede, Yogyakarta terjadi pencemaran merkuri karena pencemaran lingkungan akibat pembuangan limbah cair yang tidak baik. Penelitian ini bertujuan untuk mengetahui perbedaan kadar merkuri, kreatinin, dan urea dalam serum dan urin pekerja industri di Kotagede dibandingkan dengan pekerja industri di Kecamatan Banguntapan, Bantul. Subjek penelitian berjumlah 94 orang. Sebanyak 52 orang diambil dari Kotagede dengan kisaran umur antara 20 – 71 tahun dan lama berkerja antara 3–38 tahun. Sebanyak 42 orang dengan kisaran usia 21 – 63 tahun dan lama bekerja antara 1 – 20 tahun diambil dari pekerja industri di Banguntapan yang mempunyai kondisi geografis hampir sama dengan Kotagede. Kadar merkuri diukur menggunakan metode *atomic absorption spectrophotometry* (AAS) sedangkan kadar urea dan kreatinin diperiksa dengan kit *Dyasis.* Pada pekerja dari Kotagede, terdapat 3 orang (5,8%) dengan rerata kadar merkuri serum rerata 0,217 ppb dan tidak ditemukan merkuri dalam urin semua subjek. Pada pekerja dari Banguntapan, ditemukan seorang (2,4%) dengan kadar merkuri serum 0,200 ppb dan 6 orang (14,3%), dengan rerata kadar merkuri urin 0,395 ppb. Kadar kreatinin dan urea serum pekerja di Kotagede lebih tinggi daripada pekerja di Banguntapan ($p < 0,05$) namun masih dalam batas normal. Ditemukan merkuri pada sebagian karyawan industri di Kotagede dan Banguntapan yang meskipun dalam kadar rendah berkorelasi dengan kadar kreatinin.

KATA KUNCI kreatinin; merkuri; toksisitas; urea

ABSTRACT *Study from the Environmental Office of Yogyakarta, indicates in Kotagede found the pollution of mercury from the environmental because of improper disposal of waste water. This study aims to assess the levels of mercury, creatinine and urea in the serum and urine of people working in several industries in Kotagede and Banguntapan. Subjects of this study were 52 employees in several industries in Kotagede Yogyakarta with a range of ages between 20 - 71 years and length of work between 3 - 38 years. A total of 42 people with the age range was 21 - 63 years and the length of work between 1 - 20 years were taken from industrial employees in Bantul who has almost the same geographical conditions as Kotagede. Determination of mercury levels using the Atomic Absorption Spectrophotometry (AAS) method while the determination of urea and creatinine levels by a Dyasis kit. In Kotagede, there were 3 people (5.8%) with the average mercury serum of 0.217 ppb and no mercury in the urine was found in all subjects. In Banguntapan, one person (2.4%) had 0.200 ppb mercury serum and 6 people (14.3%) had an average mercury urine level of 0.395 ppb. Urine creatinine and urea levels in subjects from Kotagede were higher*

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than those from Banguntapan (p<0.05), despite being on the normal range. The presence of mercury in several industrial employees in Kotagede and Banguntapan is still on the low range even though it was correlated to creatinine levels.

KEYWORDS *creatinin; mercury; toxicity; urea*

1. Pendahuluan

Kecamatan Kotagede merupakan wilayah di Yogyakarta yang terkenal dengan industri kerajinan peraknya.[1] Salah satu logam berat yang digunakan dalam pengolahan kerajinan perak adalah merkuri.[2] Manusia dapat terpapar merkuri melalui lingkungan maupun kegiatan industri misalnya pembuatan perhiasan, termometer, dan baterai. Senyawa merkuri organik merupakan kontaminan lingkungan yang utama dan mudah diabsorpsi dari saluran pencernaan, dan terdistribusi di hampir semua jaringan.[3,4] Merkuri organik akan diubah menjadi bentuk anorganiknya setelah diabsorpsi dan memiliki toksisitas sama dengan senyawa anorganiknya.[5,6]

Merkuri dalam bentuk senyawa alkil mudah larut dalam lemak dan ditimbun dalam otak, ginjal, hepar, dan kulit.[7] Salah satu akibat keracunan merkuri adalah terjadinya abnormalitas renal karena efek nefrotoksik yang ditimbulkan.[8] Peningkatan kadar merkuri darah dapat menyebabkan gangguan fungsi ginjal yang dapat terlihat melalui peningkatan *biomarker* seperti kadar urea darah yang tergantung dosis.[9] Terjadinya nekrosis pada tubulus proksimal juga dapat terjadi karena toksisitas langsung pada ginjal sehingga perlu dilihat fungsi ginjal pada seseorang dengan dugaan mengalami intoksikasi merkuri.[10]

Penelitian yang dilakukan oleh Kantor Pengendalian Dampak Lingkungan Kota Yogyakarta menunjukkan bahwa Kotagede terancam penyakit Minamata karena adanya merkuri dari limbah industri yang tidak dikelola dengan baik. Sebagian besar penduduk tidak memiliki pengolahan limbah yang baik. Limbah yang dihasilkan langsung dibuang melalui *septic tank* yang tidak kedap terhadap air.[11] Menurut hasil analisis laboratorium oleh Sekarwati *et al.* kandungan logam berat pada air limbah industri kerajinan perak di Kotagede telah melebihi nilai batas baku mutu limbah cair.[12] Sementara itu, Kecamatan Banguntapan yang juga bergerak di sektor pengolaham logam dinilai memiliki pengelolaan limbah yang lebih baik dilihat dari indeks pencemaran.[13] Melihat kerentanan pekerja industri dan dampak paparan logam berat terhadap kualitas hidup pekerja, penelitian ini dilakukan untuk mengetahui kadar merkuri, urea, kreatinin dalam darah dan urin pada pekerja industri logam, serta mengetahui hubungan kadar kreatinin dan urea dengan kadar merkuri.

2. Metode

Penelitian ini menggunakan desain potong lintang dengan subjek karyawan di beberapa industri perak di Kecamatan Kotagede, Kota Yogyakarta dan di beberapa industri aluminium di Kecamatan Banguntapan, Kabupaten Bantul. Alasan pemilihan Banguntapan sebagai kelompok pembanding karena lokasi tersebut juga memiliki banyak industri yang bergerak di bidang pengolahan logam di samping memiliki kondisi geografis yang hampir sama dengan Kotagede. Pengambilan subjek dilakukan dengan cara *purposive sampling.*

Dilakukan pengambilan darah dan urin dari masing-masing subjek, kemudian kadar merkuri darah dan urin diukur dengan metode *atomic absorption spectrophotometer* (AAS). Kadar kreatinin serta urea ditentukan dengan metode spektrofotometri dengan kit *Dyasis*. Metode AAS yang digunakan dalam penelitian ini dapat mendeteksi kadar merkuri darah dan urin jika kadarnya di atas 0,189 ppb. Di bawah kadar tersebut, metode AAS tidak dapat mendeteksi.

Data yang diperoleh dari kedua kelompok tersebut adalah data parametrik yang homogen

dan dianalisis dengan *t-test*. Hubungan antara kadar merkuri dengan kadar urea dan kreatinin dianalisis dengan análisis regresi linier. Hasil dinyatakan berbeda bermakna secara statistik jika p < 0,05.

3. Hasil

Pada penelitian ini, diperoleh subjek sebanyak 94 orang yang terdiri dari 52 orang pekerja yang berasal dari Kotagede dan 42 orang pekerja yang berasal dari Banguntapan dengan karakteristik disajikan pada Tabel 1.

Pekerja industri logam di Kotagede yang menjadi subjek telah bekerja lebih lama daripada pekerja dari Banguntapan, serta berusia lebih tua (p < 0,05). Tekanan darah sistolik pekerja antara kedua wilayah berbeda memiliki perbedaan yang bermakna secara statistik (p < 0,05), sedangkan tekanan darah diastoliknya tidak berbeda bermakna (p > 0,05).

Pada penelitian ini hanya 10 sampel yang dapat dideteksi dan diketahui kadar merkuri serum. Dari 52 subjek yang diambil dari Kotagede, ditemukan 3 (5,8%) sampel darah yang mengandung merkuri (0,200 - 0,250 ppb) dengan rerata 0,217 ppb, sedangkan dalam seluruh sampel urin tidak terdeteksi adanya merkuri. Dari 42 pekerja industri di Banguntapan, ditemukan merkuri serum dengan kadar 0,200 ppb pada seorang subjek (2,4%) dan 6 sampel urin (14,3%) yang mengandung merkuri 0,200 ppb – 0,710 ppb (rerata 0,395 ppb).

Tabel 2 menunjukkan bahwa kadar urea dan kreatinin urin pada kedua kelompok berbeda bermakna (p < 0,05). Análisis regresi menunjukkan adanya korelasi antara kadar kreatinin dengan kadar merkuri (p < 0,05), namun tidak terlihat hubungan antara kadar urea dengan kadar merkuri (Tabel 3).

4. Pembahasan

Rerata umur dan lama bekerja lebih tinggi pada pekerja industri Kotagede dibandingkan dengan pekerja industri di Banguntapan. Sementara itu, rerata tekanan darah, kadar kreatinin, dan urea urin lebih tinggi pada subjek dari Banguntapan. Adanya perbedaan tekanan darah sistolik kemungkinan bukan karena paparan merkuri namun karena perbedaan usia di antara kedua kelompok tersebut.[14]

Kadar urea dan kreatinin serum antara kedua kelompok tidak berbeda bermakna, sedangkan

Tabel 1. Karakteristik subjek penelitian dan urinnya

	Kotagede n= 52	Banguntapan n= 42	*p*
Umur (tahun), rerata ± SD	42,60 ± 11,80	36,00 ± 11,30	0,004
Lama bekerja (tahun), rerata ± SD	19,73 ± 12,72	5,98 ± 4,50	0,000
Tekanan distolik (mmHg), rerata ± SD	124,04 ± 16,48	119,05 ± 8,50	0,039
Tekanan sistolik (mm/Hg), rerata ± SD	77,79 ± 12,81	75,00 ± 14,52	0,163

SD: standar deviasi

Tabel 2. Kadar kreatinin dan urea dalam serum dan urin pekerja industri di Kotagede dan Banguntapan

	Kotagede n= 52	Banguntapan n= 42	*p*
Kreatinin serum (mg/dL)	0,988 ± 0,253	1,051 ± 0,273	0,125
Kreatinin urin (mg/dL)	220,849 ± 124,383	168,581 ± 96,846	0,018
Urea serum (mg/dL)	25,877 ± 9,144	24,812 ± 6,629	0,267
Urea urin (mg/dL)	25,160 ± 17,836	16,989 ± 5,192	0,004

Tabel 3. Korelasi antara kadar merkuri dengan kadar kreatinin dan urea

	B	p	CI 95%
Kreatinin	0,250	0,037	0,029 – 0,470
Urea	-0,009	0,347	-0,034 – 0.016

kadar urea dan kreatinin urin pada kelompok pekerja dari Kotagede lebih tinggi dibandingkan pekerja dari Banguntapan (p < 0,05). Kreatinin serum adalah penanda filtrasi glomerulus endogen yang paling umum digunakan dalam praktik klinis. Namun, penggunaan kreatinin serum sebagai penanda kecepatan filtrasi glomerulus mempunyai keterbatasan, tergantung pada pasien dan pengambilan sampel.[15] Meski lebih tinggi, kadar urea dan kreatinin urin pada subjek dari Kotagede masih dalam rentang normal menurut referensi kit *Diasys* yang digunakan. Selain itu, urin yang diambil dari kedua kelompok ini adalah urin sesaat, bukan urin tampung 24 jam sehingga terdapatnya perbedaan bermakna tersebut kurang dapat menggambarkan keadaan kreatinin maupun kadar urea yang sebenarnya.

Saat kadar merkuri dihubungkan dengan kadar urea dan kreatinin, terdapat hubungan bermakna. Keracunan merkuri mungkin dapat mengakibatkan terjadinya nekrosis pada tubuli proksimal seiring dengan dosis.[16] Ekskresi merkuri dalam urin merupakan indikator keracunan merkuri anorganik atau logam merkuri, merkuri organik akan diekskresikan melalui feses. Paparan merkuri organik hanya memberikan efek minimal pada kadar merkuri urin.[17] Adanya merkuri dalam urin pada subjek dari Banguntapan dapat disebabkan oleh masuknya merkuri anorganik, sedangkan merkuri yang ditemukan dalam darah subjek dari Kotagede maupun Banguntapan kemungkinan akibat konsumsi merkuri sebagai senyawa organik.[18] Waktu paruh merkuri organik dalam darah sekitar tujuh hingga sepuluh minggu dan tiga hingga 15 hari setelah paparan uap, sedangkan waktu paruh paparan merkuri anorganik adalah tiga hingga empat minggu.[17]

Senyawa merkuri anorganik larut dalam air dan dapat diabsorpsi sebesar 7% hingga 15% dan bersifat iritan. Saat masuk tubuh, senyawa merkuri anorganik terakumulasi terutama di ginjal dan menyebabkan kerusakan ginjal. Organ target utama logam merkuri adalah otak dan ginjal.[3] Ferguson *et al.* menunjukkan bukti kuat intoksikasi merkuri awal yang terlihat pada pekerja yang mengekskresikan merkuri melalui urin lebih dari 50 ug/L dan dengan kadar dalam darah dari 3 ug/100 ml.[19] Menurut Ye *et al.*, toksisitas merkuri terjadi apabila kadarnya dalam darah lebih dari 20 ug/L dan dalam urin lebih dari 100 ug/L. Kadar tersebut dapat memunculkan dapat memunculkan gejala neurologis.[20] Pada penelitian ini, tidak terdapat kadar merkuri di atas normal pada pekerja dari kedua wilayah baik di dalam darah maupun di dalam urin. Kadar paling tinggi yang terdeteksi hanya <1 ug/L.

Keterbatasan penelitian ini adalah jumlah sampel yang terbatas sehingga hasil yang diperoleh mungkin tidak dapat menggambarkan kondisi toksisitas merkuri secara keseluruhan di lingkungan tersebut. Selain itu, urin yang diambil dan diperiksa adalah urin sesaat, bukan urin tampung 24 jam. Dari segi metode, AAS yang digunakan hanya dapat mendeteksi merkuri dengan kadar di atas 0,189 ppb sehingga tidak didapatkan kadar merkuri di bawah nilai ambang tersebut dan tidak dapat diketahui rerata per wilayah.

5. Kesimpulan

Pada penelitian ditemukan merkuri dalam urin dan serum pada pekerja industri di Kotagede dan Banguntapan meskipun masih dalam kadar rendah, namun terdapat hubungan antara merkuri dengan kadar kreatinin.

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Konflik kepentingan

Penulis menyatakan tidak ada konflik kepentingan dengan pihak-pihak yang terkait dalam penelitian ini.

Daftar pustaka

1. Subagio OMR, Budiati SR. Pengaruh keberadaan industri kerajinan perak terhadap penyerapan tenaga kerja dan pendapatan pekerja di Kecamatan Kotagede Yogyakarta. *Jurnal Bumi Indonesia*. 2013;2(2):68-77
2. Sutarni S. Toksisitas merkuri sebagai faktor risiko epilepsi anak. *Berita Kedokteran Masyarakat*. 2005;21(5)
3. Park J and Zheng W, 2012, Human exposure and health effects of inorganic and elemental mercury. *J Prev Med Public Health*. 2012;45(6): 344–352.
4. Salthammer T, Uhde E, Omelan A, Ludecke A, Moriske HJ. Estimating human indoor exposure to elemental mercury from broken compact fluorescent lamps (CFLs) Indoor Air. 2012;22:289–98.
5. Risher J, Amler S. Mercury exposure: evaluation and intervention the inappropriate use of chelating agents in the diagnosis and treatment of putative mercury poisoning. *Neurotoxicology*. 2005;26(4): 691–699
6. Nayfeh A, Kassim T, Addasi N, Alghoula F, Holewinski C, Depew Z. A Challenging case of acute mercury toxicity. *Case reports in medicine*. 2018;2018 Article ID 1010678, 4 pages
7. Bjørklund G, Dadar M, Mutter J, Aaseth J. The toxicology of mercury: Current research and emerging trends. *Environ Res*. 2017; 159:545-554.
8. Orr S, Bridges C. Chronic kidney disease and exposure to nephrotoxic metals. *Int J Mol Sci*. 2017 May;18(5):1039.
9. Pollack AZ, Mumford SL, Mendola P, Perkins NJ, Rotman Y, Wactawski-Wende J *et al*. Kidney biomarkers associated with blood lead, mercury, and cadmium in premenopausal women: a prospective cohort study. *J Toxicol Environ Health.* 2015 Jan 17;78(2):119-31.
10. Liu J, Goyer RA, Waalkes MP. Toxic effects of metals. In: Casarett LJ, Klaassen CD, editors. Casarett and Doull's toxicology: The basic science of poisons. 7th ed. McGraw-Hill, New York: McGraw-Hill; 2008.
11. Suara Merdeka. Kotagede terancam Minamata [Internet]. Jawa Tengah: Suara Merdeka; 2004 [cited 2019 Jan 10]. Available from: http://www.suaramerdeka.com/harian/04010/20/nas14.htm
12. Sekarwati N, Murachman B, Sunarto. Dampak logam berat Cu (*tembaga)* dan Ag (*Perak*) *pada limbah cair industri perak terhadap* kualitas air *sumur* dan kesehatan masyarakat serta upaya pengendaliannya di *Kotagede Yogyakarta. Jurnal Ekosains*. 2015;7(1):64-76
13. Langgeng WS, Murti SH. Kajian kerusakan lingkungan perairan sungai akibat aktivitas industri di Kecamatan Banguntapan Kabupaten Bantul [master's thesis]. Yogyakarta: Universitas Gadjah Mada; 2016.
14. Weber C. An overview of blood pressure and aging, what happens to blood pressure as we age? Verywell Health; 2018 [updated 2018 Dec 9; cited 2019 Jan 10]. Available from: https://www.verywellhealth.com/what-happens-to-blood-pressure-as-we-age-1763944
15. Sandilands EA, Dhaun N, Dear JW, Webb DJ. Measurement of renal function in patients with chronic kidney disease. *Br J Clin Pharmacol*. 2013;76(4): 504–515
16. Clarkson TW, Magos L. The toxicology of mercury and its chemical compounds. *Crit Rev Toxicol*. 2006; 36(8): 609–662.
17. Davidson J. Mercury testing: Fact Sheet. June 2010, Auckland City Hospital: Labplus.
18. Diner B, Brenner B. Toxicity of mercury: Treatment of mercury intoxication [Internet]. Emedicine-The instant acess to the minds of medicine; 2001 [updated 2018 Nov 5; cited 2019 Jan 10]. Available from: http://www.emedicine.com/ emerg/topic813.htm
19. Ferguson SA, Smith M, Sullivan M, Keazer L, Lyon S, Childress A *et al.* 2002, Monitoring

mercury exposure [Internet]. 2002 [cited 2019 Jan 10]. Available from: http:/danpatch.eca.purdue.edu/~epados / mercbuild/scr/credits.htm.

20. Ye BJ, Kim BG, Jeon MJ, Kim SY, Kim HC, Jang TW *et al*. Evaluation of mercury exposure level, clinical diagnosis and treatment for mercury intoxication. *Ann Occup Environ Med*. 2016 Dec;28(1):5.

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Studi dukungan sosial keluarga dengan perkembangan kemandirian emosional remaja usia sekolah menengah pertama *full day school*

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ABSTRAK Remaja awal di sekolah menengah pertama *full day school*, kemungkinan tidak matur pada perkembangan kemandirian emosionalnya. Penelitian ini bertujuan untuk menganalisis hubungan antara dukungan sosial orang tua dengan perkembangan kemandirian emosional pada remaja usia sekolah menengah pertama *full day school* di Kabupaten Jember. Desain penelitian ini adalah *cross-sectional*, dengan subjek 154 remaja berusia 13-15 tahun yang dipilih dengan *stratified random sampling*. Data yang diambil dalam penelitian ini meliputi karakteristik remaja, *perceived social support-family (PSC-Fa)*, dan *emotional autonomy scale (EAS)*. Hasil menunjukkan bahwa remaja memiliki dukungan sosial keluarga yang baik (70,8%) dan kemandirian emosional yang tinggi (54,5%). Ada hubungan yang signifikan antara dukungan sosial keluarga dengan otonomi emosional remaja sekolah menengah pertama *full day school* (X^2 = 5,27; *p-value* = 0,02). Remaja dengan dukungan sosial keluarga sedang dapat mencegah ketidakmatangan kemandirian emosional (OR = 0,427; 95% CI = 0,205-0,881). Dukungan sosial keluarga diperlukan dalam perkembangan maturitas kemandirian emosional remaja. Oleh karena itu, orang tua perlu memberikan dukungan sosial pada remaja selama perubahan perkembangannya.

KATA KUNCI dukungan sosial keluarga; *full day school*; kemandirian emosional remaja; perkembangan remaja; remaja awal.

ABSTRACT *Early adolescent in high school with full day school may not yet mature in emotional autonomy development. The purpose of this study is analyze the correlation between family social support and emotional autonomy in adolescent aged junior high school full day school in Districts of Jember. Design of this study is cross-sectional which is conducted among 154 adolescent aged 13-15 years with stratified random sampling. Data collected in this study were participant characteristics, family social support (PSS-FA), and emotional autonomy (EAS). Result shows that among adolescent have good family social support (70.8%) and high emotional autonomy (54.5%). There is a correlation between family social support and emotional autonomy of the adolescent with full day school (X^2 = 5.27; p-value = 0.02). Adolescent with moderate family social support can prevent emotional autonomy immaturity (OR = 0.427; 95% CI = 0.205-0.891). Family social support is needed to develop maturity emotional autonomy among adolescent. Therefore, the parents needs to give social support for adolescent during their change of development.*

KEYWORDS *family social support; full day school; adolescent emotional autonomy; adolescent development; early adolescent.*

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1. Pendahuluan

Perkembangan emosional menentukan keberhasilan pencapaian tugas perkembangan remaja sesuai teori pertumbuhan dan perkembangan Havinghurts. Hasil penelitian menunjukkan bahwa 30,1 % remaja di Kabupaten Jember belum matur secara emosional selama masa pubertas.[1] Peran orang tua sangat penting terutama terhadap perkembangan emosional remaja.[2] Oleh karena itu, remaja memerlukan dukungan sosial keluarga agar dapat matur secara emosional sesuai dengan perkembangannya.

Pencapaian perkembangan emosional remaja di Kalisat Kabupaten Jember belum optimal di mana 19,4% remaja memiliki perkembangan emosional sedang.[3] Kemandirian emosional pada remaja dipengaruhi oleh faktor keturunan, pola asuh orang tua, sistem kehidupan di masyarakat dan sistem pendidikan di sekolah, perubahan jasmani, pola interaksi dengan orang tua, teman sebaya, dan lingkungan sekolah.[4] Perkembangan emosional remaja yang tidak tercapai akan berdampak pada perkembangan remaja selanjutnya.

Perkembangan emosional remaja yang tidak tercapai akan menyebabkan masalah kesehatan pada remaja. Masalah kesehatan yang sering muncul antara lain kenakalan remaja, gangguan emosi, dan penyalahgunaan alkohol.[5] Peranan orang tua sangat penting dalam memberikan dukungan sosial untuk mengurangi dampak perkembangan emosional yang tidak tercapai pada remaja. Dukungan sosial dan lingkungan masyarakat juga menjadi faktor yang dapat berpengaruh terhadap perkembangan penyesuaian diri remaja.[6] Orang tua perlu mendukung remaja dalam kematangan emosional dengan memberikan dukungan sosial, terutama pada remaja usia menengah pertama yang mengikuti kegiatan *full day school*.

Full day school diatur dalam Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 23 Tahun 2017 tentang Hari Sekolah. Hari sekolah dilaksanakan sehari selama 8 jam.[7] Alasan orang tua mengikutsertakan anak dalam program *full day school* karena sebagian orangtua saat ini memiliki pekerjaan yang menyita waktu dari pagi hingga sore sehingga pada siang hari ketika anak sudah pulang tidak ada yang menyambut dan menemani mereka di rumah.[8] Waktu remaja untuk berinteraksi dengan teman sebaya menjadi lebih banyak.

Terdapat Sekolah Menengah Pertama (SMP) A dan B yang menerapkan *full day school*. Pembelajaran *full day school* berlangsung sekitar 8 jam 30 menit. Tujuan penerapan *full day school* di SMP yaitu menghindarkan anak dari pergaulan bebas dan memasukan materi keagamaan untuk pembekalan siswa. Orang tua siswa yang mengikuti *full day school* mayoritas sibuk bekerja dan pulang hingga sore.

Tumbuh kembang remaja perlu dukungan sosial keluarga dan fasilitator untuk dapat mewujudkan ketercapaian perkembangan remaja yang mandiri, sehat, sukses, dan berkepribadian baik. Peran perawat memfasilitasi remaja untuk dapat mencapai kemandirian emosional pada tahap perkembangan dan perkembangan selanjutnya. Oleh karena itu, fokus penelitian ini adalah menganalisis hubungan antara dukungan sosial dan perkembangan kemandirian emosional pada remaja usia SMP yang mengikuti kegiatan *full day school* di Kabupaten Jember.

2. Metode

Jenis penelitian ini adalah analitik korelasional dengan pendekatan *cross-sectional*. Penelitian ini dilaksanakan pada Januari 2019 di SMP *full day school* di Kabupaten Jember. Jumlah populasi pada penelitian ini adalah 481 remaja berusia 13-15 tahun yang mengikuti *full day school*. Pengambilan sampel dilakukan menggunakan *probability sampling* dengan teknik *stratified random sampling*. Dari perhitungan, dieproleh jumlah sampel sebanyak 192 remaja. Sampel diambil dari SMP *full day school* di Kabupaten Jember yang diproporsi

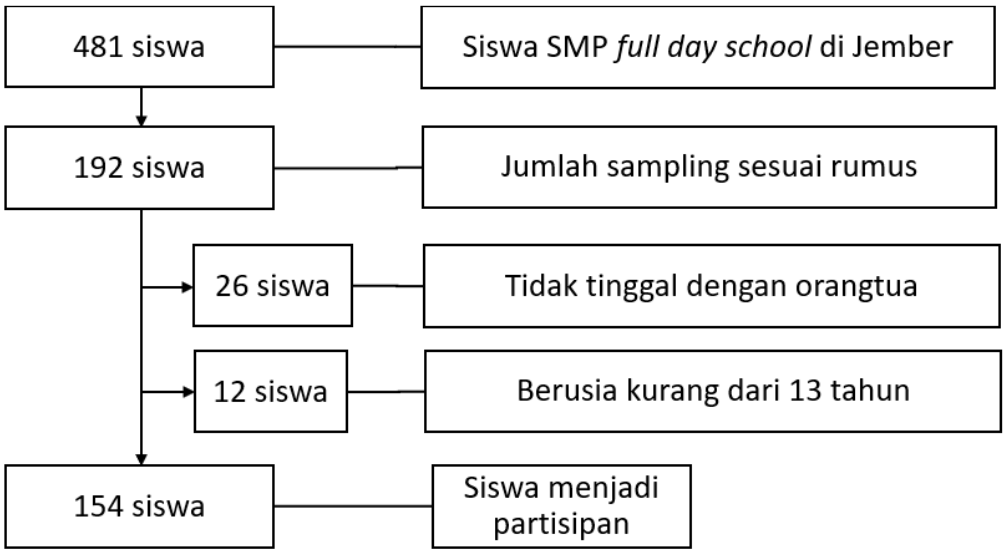
menggunakan rumus sehingga didapatkan sampel penelitian tiap kelas dari masing-masing sekolah. Pengambilan sampel penelitian disesuaikan dengan kriteria inklusi dan eksklusi yang telah ditetapkan sebagaimana ditunjukkan dalam Gambar 1. Kriteria inklusi pada penelitian ini yaitu siswa yang tinggal dengan orang tua dan bersedia menjadi responden, sedangkan, kriteria eksklusi pada penelitian ini yaitu siswa yang tidak hadir pada hari pelaksanaan dan tidak diizinkan oleh orang tua mengikuti penelitian.

Karakteristik remaja yang meliputi nama, usia, jenis kelamin, pekerjaan orang tua, tempat tinggal, jumlah saudara, dan orang tua yang masih ada dicatat.

Instrumen dukungan sosial keluarga yang digunakan adalah *perceived social support-family* (PSS-Fa). Kuesioner ini terdiri dari 20 pernyataan tentang dukungan sosial keluarga yang telah dilakukan *back translate* ke bahasa Indonesia. Kuesioner tersebut berisi pertanyaan tertutup dengan menggunakan skala Guttman. Nilai dari masing-masing jawaban pada variabel dukungan sosial keluarga dibagi menjadi indikator *favorable* dan *unfavorable.* Indikator *favorable* terdiri dari respon jawaban "ya" yang diberi skor 3 (menunjukkan adanya dukungan dari keluarga); jawaban "tidak" yang diberi skor 2; dan jawaban "tidak tahu" yang diberi skor 1. Indikator *unfavorable* terdiri dari respon jawaban "tidak" yang diberi skor 3 (menunjukkan ada dukungan dari keluarga); jawaban "ya" yang diberi skor 2; dan jawaban "tidak tahu" yang diberi skor 1.[9] Total skor yang diperoleh diklasifikasikan menjadi tiga yaitu 20-33 (kurang); 34-47 (cukup); dan 48-60 (baik).[9]

Kuesioner PSS-Fa sudah diuji validitas dan reliabilitasnya.[9] Uji validitas dilakukan terhadap 20 item pernyataan yang memiliki nilai *r* hitung > *r* tabel (0,361). Uji reliabilitas yang telah dilakukan menunjukkan *Cronbach Alpha* 0,752.

Instrumen yang digunakan untuk mengukur kemandirian emosional adalah *emotional autonomy scale (EAS)*. Kuesioner tersebut terdiri dari 20 pernyataan tentang kemandirian emosional yang telah baku dan dilakukan *back translate ke* dalam Bahasa Indonesia. Kuesioner tersebut tersusun dalam bentuk pernyataan tertutup dengan menggunakan skala Likert. Jawaban pada variabel kemandirian emosional dibagi menjadi: sangat setuju, setuju, tidak setuju, dan sangat tidak setuju dengan nilai yang berbeda. Pada indikator *favorable*, respon jawaban "sangat setuju" diberi skor 4; jawaban "setuju" diberi skor 3; "tidak



Gambar 1. Alur Pengambilan partisipan

setuju" diberi skor 2; dan jawaban "sangat tidak setuju" diberi skor 1, sedangkan pada indikator *unfavorable,* jawaban "sangat tidak setuju" diberi skor 4; jawaban "tidak setuju" diberi skor 3; "setuju" diberi skor 2; dan jawaban "sangat setuju" diberi skor 1. Ttotal skor yang diperoleh diklasifikasikan menjadi tiga yaitu <40 (rendah); 41-50 (sedang); dan >51 (tinggi). Berdasarkan hasil penilaian *content validity index* (CVI) dari ahli didapatkan nilai 0,97 yang menunjukkan bahwa isi kuesioner kemandirian emosional tersebut valid. Uji reliabilitas dilakukan pada 154 partisipan dan didapatkan nilai *alpha cronbach* total 0,67, sehingga kuesioner ini reliabel digunakan sebagai alat ukur kemandirian emosional remaja.

Analisis data dilakukan dengan aplikasi *software* SPSS 20. Data kategorik disajikan dalam bentuk jumlah dan persentase. Data numerik dengan distribusi normal disajikan dalam bentuk *mean* dan *standar deviasi*, sedangkan data dengan distribusi tidak normal disajikan dalam bentuk *median* dan *percentiles* 25-75. Analisis bivariat dalam penelitian ini dilakukan dengan uji *Chi square* untuk mengetahui hubungan dukungan sosial keluarga dengan kemandirian emosional remaja.

3. Hasil

Tabel 1 menunjukkan karakteristik partisipan. Partisipan penelitian ini umumnya adalah remaja laki-laki. Remaja mayoritas tinggal di kota dan hanya sebagian remaja yang tinggal di desa. KPekerjaan orang tua siswa yang terbanyak adalah wiraswasta. Partisipan mayoritas memiliki jumlah saudara kandung sebanyak dua dan orangtuanya mayoritas masih utuh.

Analisis univariat pada variabel penelitian dilakukan dengan tujuan menggambarkan dukungan sosial keluarga dan kemandirian emosional partisipan (Tabel 2). Hasil analisis menunjukkan bahwa dukungan sosial keluarga

Tabel 1. Distribusi karakteristik partisipan (n= 154)

Karakteristik Responden	
Usia, mean ± SD	13,93±0,817
Jenis kelamin, n (%)	
Perempuan	65 (42,3)
Laki-laki	89 (57,8)
Pekerjaan orang tua, n (%)	
Ustad	2 (1,3)
TNI	2 (1,3)
Dokter	3 (1,9)
Petani	4 (2,6)
Perawat	4 (2,6)
Dosen	4 (2,6)
Pengusaha	6 (3,9)
Karyawan	7 (4,5)
Pegawai	53 (34,4)
Wiraswasta	69 (44,8)
Tempat tinggal, n (%)	
Desa	36 (23,4)
Kota	118 (76,6)
Jumlah saudara kandung, n (%)	
Lima	8 (5,2)
Empat	12 (7,8)
Satu	32 (20,8)
Tiga	36 (23.4)
Dua	66 (42,9)
Orang tua utuh, n (%)	
Tidak utuh	7 (4,5)
Masih utuh	147 (95,5)

SD: standar deviasi

Tabel 2. Gambaran dukungan sosial keluarga dan kemandirian emosional partisipan (n=154)

Variabel	n (%)
Dukungan sosial keluarga	
Cukup	45 (29,2)
Baik	109 (70,8)
Kemandirian Emosional	
Rendah	4 (2,6)
Sedang	66 (42,9)
Tinggi	84 (54,5)

yang diterima oleh remaja usia sekolah menengah pertama di SMP *full day school* di Kabupaten Jember mayoritas baik (70,2%). Mayoritas partisipan memiliki kemandirian emosional matur (54,5%). Terdapat remaja yang teridentifikasi belum matur sebanyak 2,6%.

Hubungan antara dukungan sosial keluarga dan kemandirian emosional partisipan dianalisis secara bivariat (Tabel 3). Uji tersebut menggunakan tabel 2x2 yang merupakan hasil dari penggabungan antar sel. Kemandirian emosional remaja semula memiliki tiga kategori yaitu kemandirian emosional rendah, sedang, dan tinggi. Kategori emosional rendah digabungkan dengan kategori sedang sehingga terdapat dua kategori, yaitu kemandirian emosional sedang dan tinggi[10]. Penelitian lain tentang kemandirian emosional remaja juga mengategorikan kemandirian remaja menjadi dua berdasarkan nilai *cut off point* yaitu kategori rendah dan tinggi.[11] Analisis data menggunakan uji dengan tabel 2x3 tidak memenuhi syarat untuk dilakukannya uji *Chi-Square* karena terdapat nilai *expected* kurang dari lima lebih dari 20% dari jumlah sel. Oleh karena itu, dilakukan uji alternatif dengan cara menggabungkan sel sehingga diperoleh tabel 2x2 dengan pertimbangan subjek kategori rendah paling sedikit.[12]

Terdapat perbedaan tingkat kemandirian emosional remaja usia sekolah menengah pertama di SMP *full day school* Kabupaten Jember antara dukungan sosial keluarga yang cukup dan baik. Dukungan sosial keluarga cukup akan mencegah 0,427 kali ketidaktercapaian kemandirian emosional remaja (OR=0,427; 95% CI=0,205-0.891).

4. Pembahasan

Penelitian ini menunjukkan hubungan antara dukungan sosial keluarga dengan kemandirian emosional pada remaja usia sekolah menengah pertama yang mengikuti kegiatan *full day school* di Kabupaten Jember. Remaja yang mandiri dalam aspek emosional ditandai dengan kemampuan untuk tidak bergantung pada orang tua terutama secara emosional.[13] Pada penelitian ini remaja yang mendapat dukungan sosial cukup dari keluarga memiliki kemandirian emosional tinggi. Oleh karena itu, orangtua perlu memperhatikan pemberian dukungan sosial pada remaja.[14] Pemberian dukungan sosial yang cukup pada remaja akan mencegah ketidaktercapaian kemandirian emosional remaja.

Dukungan sosial keluarga yang diterima oleh remaja usia sekolah menengah pertama di SMP *full day school* di Kabupaten Jember mayoritas baik dan cukup. Hal tersebut mungkin disebabkan karena mayoritas remaja tinggal di perkotaan. Hasil penelitian ini berbeda dengan mayoritas remaja di Kecamatan Sukowono yang mendapat dukungan keluarga rendah.[3] Perbedaan tersebut kemungkinan disebabkan oleh karakteristik tempat tinggal remaja yang berbeda, di mana penelitian sebelumnya dilakukan pada remaja yang tinggal di desa.[3, 15]

Terdapat faktor lain yang menyebabkan

Tabel 3. Hubungan dukungan sosial keluarga dengan kemandirian emosional remaja usia sekolah menengah pertama di SMP *full day school* di Kabupaten Jember (n= 154)

Dukungan Sosial Keluarga	Kemandirian Emosional		χ^2 (*signifikansi*)	OR	95% CI
	Rendah+Sedang n (%)	Tinggi n (%)			
Cukup	14 (20,0)	31 (36,9)	5,27 (0,02)	0,427	0,205-0,891
Baik	56 (80,0)	53 (63,1)			

n (%): Jumlah partisipan (persentase); OR: *Odds Ratio*; χ^2: *Pearson Chi-Square*; 95% CI: 95% *Confidence Interval*

persentase dukungan sosial keluarga pada penelitian ini berbeda dengan penelitian sebelumnya, yaitu faktor usia dan pekerjaan orang tua . Seiring dengan bertambahnya usia kehidupan sosial remaja yang semakin meluas, maka peran dan dukungan orangtua mulai berkurang karena remaja mencoba untuk menjadi individu yang mandiri.[16, 17] Pada penelitian ini mayoritas orang tua berwiraswasta. Orangtua yang bekerja di kantor lebih sibuk dan menggunakan lebih banyak waktu untuk bekerja.[18]

Tingkat kemandirian emosional remaja usia sekolah menegah pertama di SMP *full day school* di Kabupaten Jember tinggi kemungkinan karena remaja mengikuti kegiatan *full day school*. Penelitian lain menyebutkan bahwa tingkat kemandirian emosional remaja SMP sedang.[19] Perbedaan tersebut kemungkinan terjadi karena remaja yang mengikuti *full day school* sehingga remaja memiliki banyak waktu untuk bersosialisasi dengan teman sebaya. Faktor lain yang mungkin dapat memengaruhi adalah faktor usia, jenis kelamin, dan tempat tinggal.[20,21] Mayoritas tempat tinggal remaja yang mengikuti *full day school* di Kabupaten Jember tinggal di kota.

Penelitian ini menunjukkan adanya hubungan antara dukungan sosial keluarga dengan kemandirian emosional remaja usia sekolah menengah pertama yang mengikuti kegiatan *full day school* di Kabupaten Jember. Apabila orang tua memberikan dukungan sosial keluarga cukup, kemungkinan perkembangan kemandirian emosional remaja akan tercapai sesuai dengan tahap perkembangannya. Dukungan yang berlebihan dari orang tua dalam merespon sikap remaja sering kali mengarah pada sikap pengekangan.[16] Remaja yang terlalu dikekang oleh orang tua akan mengalami hambatan perkembangan sehingga remaja menjadi tidak mandiri, takut untuk berkompetisi, tidak berani mengambil keputusan, tidak bertanggung jawab, dan lebih senang dipimpin daripada memimpin.[16]

5. Kesimpulan

Dukungan sosial keluarga berhubungan dengan kemandirian emosional remaja yang mengikuti kegiatan *full day school* di Kabupaten Jember. Remaja yang mendapat dukungan sosial keluarga baik berpeluang 0,427 kali untuk memiliki tingkat kemandirian emosional dengan kategori rendah dan sedang. Keluarga perlu memberikan dukungan sosial sesuai dengan apa yang dibutuhkan remaja. Remaja membutuhkan perhatian pada masa perkembangannya, tetapi tidak baik jika dukungan diberikan secara berlebihan karena dapat menghambat perkembangan kemandirian emosional remaja. Instansi pendidikan perlu membuat program pembelajaran untuk meningkatkan kemandirian emosional remaja seperti program pembelajaran kelompok dengan teman sebaya. Penerapan *full day school* sangat tepat untuk mengoptimalkan kemandirian emosional remaja.

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Konflik kepentingan

Penelitian ini tidak menerima hibah khusus dari lembaga pendanaan di sektor publik, komersial, atau nirlaba. Tidak terdapat konflik kepentingan dalam penelitian ini.

Daftar pustaka

1. Susanto T, Saito R, Syahrul, Kimura R, Tsuda A, Tabuchi N, et al. Immaturity in puberty and negative attitudes toward reproductive health

among Indonesian adolescents. *Int J Adolesc Med Health*. 2018;30(3).

2. Camara M, Bacigalupe G, Padilla P. The role of social support in adolescents: are you helping me or stressing me out? *Int J Adolesc Youth*. 2017;22(2):123–36.
3. Sari DAECM. Hubungan dukungan keluarga dengan motivasi remaja terhadap pernikahan dini di Desa Sukowono, Kecamatan Sukowono, Kabupaten Jember [Skripsi] Jember: Program Studi Ilmu Keperawatan Universitas Jember; 2015.63p.
4. Fadhillah N, Faradina S. Hubungan kelekatan orangtua dengan kemandirian remaja SMA di Banda Aceh. *Jurnal Ilmiah Mahasiswa Psikologi.* 2016;1(3):42–51.
5. Amandeep. Emotional intelligence in relation to perceived parenting style of early adolescents. *International Journal of Indian Psychology*. 2017;4(3):28–39.
6. Aristya DN, Rahayu A. Hubungan dukungan sosial dan konsep diri dengan penyesuaian diri remaja kelas X SMA Angkasa I Jakarta. J*urnal Humaniora*. 2018;2(2):1–7.
7. Kemendikbud. Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 23 Tahun 2015 tentang Penumbuhan Budi Pekerti. 2015;1–8.
8. Agnes Y, Tambunan T, Ediati A. Problem emosi remaja ditinjau dari pola asuh orangtua: Studi komparasi pada siswa SMK Parulian 1 Medan. *Empati*. 2016;5(2):340–7.
9. Priastana IKA, Haryanto J, Suprajito. Peran dukungan sosial keluarga terhadap berduka kronis pada lansia yang mengalami kehilangan pasangan dalam Budaya Pakurenan. *Indonesian Journal of Health Research*. 2018;1(1):20–6.
10. Susanto T, Rahmawati I, Wantiyah W. Pengaruh *visualization in participatory program* (VIPP) dan metode ceramah terhadap pengetahuan, sikap, dan ketrampilan kesehatan reproduksi remaja di Jember. *Jurnal Kesehatan Reproduksi*. 2017;8(2):119–29.
11. Nora A, Alam TS. Tingkat kemandirian emosional remaja di Gampong Pango Raya Kecamatan Ulee Kareng, Banda Aceh. *Jurnal Keperawatan Unsiyah*. 2017;2(2):1–7.
12. Susanto T, Sahar J, Widyatuti. Aplikasi *peer to peer* model perilaku seksual remaja dan kesehatan reproduksi di Tugu, Cimanggis Kecamatan, Depok, Jawa Barat of Indonesia. *Jurnal Ners Indonesia*. 2014;5(1):36–44.
13. Steinberg L, Silverberg SB. The vicissitudes of autonomy in early adolescence. *Child Dev.* 1986;57(4):841–51.
14. Susanto T. Pengaruh Terapi keperawatan keluarga terhadap tingkat kemadirian keluarga dengan permasalahan kesehatan reproduksi pada remaja di Kelurahan Ratujaya Kecamatan Pancoran Mas Kota Depok. *Jurnal Keperawatan*. 2010;1(2):190–8.
15. Ritanti, Wiarsih W, Asih ID, Susanto T. A phenomenological study of families with drug-using children living in the society. *Int J Pediatr Adolesc Med*. 2017;4(3):100–7.
16. Peter R. Peran Orangtua dalam Krisis Remaja. *Humaniora*. 2015;6(4):453.
17. Susanto T. Game terapi sebagai strategi intervensi keperawatan komunitas dalam pemenuhan kebutuhan kesehatan reproduksi remaja di Kelurahan Tugu Kecamatan Cimanggis Kota Depok. *The Indonesian Journal of Health Science*. 2014;5(1):63–79.
18. Ayu SM, Djannah SN, Wardani Y. Hubungan antara dukungan sosial dengan kesiapan menghadapi menarche pada siswi kelas VII di SMP 1 Playen, Gunungkidul. *Kes Mas.* 2010;4(3):166–72.
19. Hapsari AS, Sismiati A, Herdi. Profil kemandirian remaja (Survey di SMA Negeri 39 Jakarta siswa kelas XI Tahun. *Survey Remaja*. 2013;1(2):1–7.
20. Susanto T, Rahmawati I, Wantiyah. A community-based friendly health clinic: An initiative adolescent reproductive health project in the

rural and urban areas of Indonesia. *Int J Nurs Sci*. 2016;3(4):371–8.

21. Kholifah SN, Yumni H, Minarti, Susanto T. Structural model of factors relating to the health promotion behavior of reproductive health among Indonesian adolescents. *Int J Nurs Sci*. 2017;4(4):367–73.

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Evaluasi HbA1c, hs-CRP, dan indeks massa tubuh pada populasi sehat: Sebuah studi komunitas

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ABSTRAK Resistensi insulin sebagai penyebab diabetes melitus tipe 2 berhubungan dengan proses inflamasi subklinis. Resistensi insulin bersama obesitas, hipertensi, dan dislipidemia berkontribusi dalam sindroma metabolik, sebuah kondisi yang berkaitan erat dengan peningkatan risiko penyakit kardiovaskular. *High sensitivity C-reactive protein* (hs-CRP) merupakan penanda inflamasi yang diduga berkaitan baik dengan diabetes melitus tipe 2 dan penyakit kardiovaskular. Banyak penelitian menemukan hubungan antara hs-CRP dengan HbA1c sebagai penanda kendali glikemik pada subjek diabetes melitus. Penelitian ini mengevaluasi hs-CRP, HbA1c, dan indeks massa tubuh (IMT) pada sebuah komunitas dengan subjek sehat. Studi potong-lintang ini merupakan penelitian analitik observasional yang mengevaluasi hubungan antara hs-CRP dengan HbA1c dan IMT. Subjek penelitian adalah semua subjek sehat pada suatu komunitas yang dikumpulkan pada program pengabdian masyarakat dan apabila ditemukan tanda gejala infeksi atau inflamasi yang nyata maka akan dieksklusi. Pengukuran hs-CRP dan HbA1c dilakukan dengan metode *high performance liquid chromatography* (HPLC) dan *enzyme-linked immunosorbent assay* (ELISA) secara berturut-turut. Hasil pengukuran dianalisis secara statistik untuk mengevaluasi karakteristik subjek dan menilai hubungan antar parameter yang diteliti menggunakan uji beda dan uji korelasi. Pada 25 subyek yang terlibat, diketahui 96% memiliki nilai HbA1c < 6,5% dengan IMT normal sebanyak 15 subyek (60%) dan sisanya masuk ke dalam kategori *overweight*. Median kadar hs-CRP didapatkan 2,99 mg/L (0,81-13,74 mg/L) dengan kategori risiko penyakit jantung rendah, hanya 4% dari seluruh subyek penelitian. Tidak didapatkan korelasi antara hs-CRP baik dengan HbA1c (r = 0,35; p = 0,868) maupun dengan IMT (r = 0,37; p = 0,069). Hanya didapatkan 1 subyek yang termasuk dalam kriteria diagnostik, akan tetapi 96% populasi penelitian memiliki hs-CRP yang termasuk ke dalam kategori risiko sedang dan tinggi untuk penyakit jantung. Tidak ditemukan hubungan antara hs-CRP dengan HbA1c dan IMT pada populasi sehat dalam komunitas ini.

KATA KUNCI HbA1c; hs-CRP; indeks massa tubuh

ABSTRACT *Insulin resistance as a cause of type 2 diabetes mellitus is associated with subclinical inflammatory processes. Insulin resistance with obesity, hypertension, and dyslipidemia contribute to metabolic syndrome that increased risk of cardiovascular disease. High sensitivity C-reactive protein (hs-CRP) is an inflammatory marker that is thought to be associated with both type 2 diabetes mellitus and cardiovascular disease. This study evaluated hs-CRP, HbA1c, and body mass index in a healthy community. This cross-sectional study is an observational analytic study evaluating the association between hs-CRP, HbA1c, and body mass index (BMI). The research subjects were all healthy on a community gathering in community service programs, and if there were any signs or symptoms of infection or inflammation, they would be excluded. Measurements of hs-CRP and HbA1c were carried out using the HPLC and ELISA methods, respectively. The measurement results were analyzed to evaluate the characteristics of the*

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subject and assess the relationship between the parameters studied with different mean and correlation tests. In 25 subjects involved, it was found that 96% had an HbA1c value of <6.5% with a normal BMI of 15 subjects (60%), and the rest were in the category of overweight. The median hs-CRP level was 2.99 mg / L (0.81-13.74 mg / L), with a low heart risk category of only 4% of all study subjects. There was no correlation between hs-CRP with HbA1c (r = 0.35; p = 0.868) and BMI (r = 0.37; p = 0.069). Only one subject was included in the diabetes diagnostic criteria, but 96% of the study population had hs-CRP, which was included in the medium-risk and high-risk category for heart disease. There was no association between hs-CRP and HbA1c and BMI in healthy populations in this community.

KEYWORDS *HbA1c; hs-CRP; body mass index*

1. Pendahuluan

Hubungan antara inflamasi subklinis yang berlangsung kronis dengan kejadian resistensi insulin telah banyak dan sudah sejak lama diteliti.[1] Kondisi resistensi insulin merupakan penyebab utama seseorang menderita diabetes melitus tipe 2 (DMT2) yang bersama-sama dengan hipertensi, dislipidemia, dan obesitas sentral menjadi kriteria diagnostik dari sindroma metabolik.[2,3] Sindroma ini diketahui berhubungan dengan peningkatan dua kali lipat risiko, insidensi, morbiditas, dan mortalitas penyakit kardiovaskular seperti penyakit jantung koroner.[4] Hubungan antara perkembangan DMT2 dan penanda inflamasi seperti *C-reactive protein* (CRP), *interleukin-6* (IL-6), fibrinogen, dan *plasminogen activator inhibitor 1* (PAI-1) telah banyak didiskusikan. Peningkatan kadar CRP dalam serum berkorelasi dengan kejadian toleransi glukosa terganggu sehingga digunakan sebagai indikator perkembangan DMT2.[5] Selain itu, diketahui penyakit kardiovaskular melibatkan proses inflamasi dalam proses patogenesisnya, sehingga CRP juga telah banyak diinvestigasi kaitannya dalam pembentukan arteriosklerosis, khususnya *high sensitivity*-CRP (hs-CRP). Penggunaan parameter hs-CRP dengan menggunakan metode deteksi CRP dengan ambang sensitifitas analitik yang jauh lebih rendah dapat digunakan untuk mendeteksi inflamasi dalam level subklinis. Parameter ini dapat digunakan untuk menilai risiko kardiovaskular mayor pada waktu yang akan datang (hs-CRP <1 mg/L = risiko rendah; 1–3 mg/L = risiko sedang; 3–10 mg/L = risiko tinggi; 10 mg/L = peningkatan tidak spesifik).[6] Berdasarkan penelitian Schumber *et al.* (2005), terdapat hubungan antara sedikit peningkatan hs-CRP dengan penurunan vasoreaktifitas koroner pada subjek dewasa muda yang menderita DM tipe 1 (DMT1) tanpa komplikasi.[7] Di sisi lain, hemoglobin A1c (HbA1c), sebagai penanda kendali glikemik jangka panjang, berkorelasi dengan kadar hs-CRP pada populasi DM tipe 2.[8] Pada penelitian yang melibatkan subjek yang tidak DM, CRP memiliki korelasi dengan HbA1c baik pada perempuan saja.[9]

Obesitas telah menjadi penyakit epidemik mayor di dunia yang merupakan faktor risiko penting DMT2 serta gangguan metabolism karbohidrat, lemak, dan protein secara kronis.[10] Kondisi ini berkaitan dengan menurunnya toleransi glukosa, perubahan homeostasis glukosa-insulin, penurunan bersihan metabolik dari insulin dan penurunan pembuangan glukosa yang distimulasi insulin.[11] Saat ini, pengukuran antropometri menggunakan lingkar pinggang merupakan parameter yang paling baik karena dapat menilai lemak visceral yang berkaitan dengan risiko penyakit kardiovaskular. Namun demikian, parameter ini tidak dapat digunakan untuk pengukuran lemak subkutan abdomen dan lemak total tubuh sehingga digunakan parameter lain untuk mengukur lemak tersebut. Indeks massa tubuh (IMT) telah diketahui sebagai indikator yang baik untuk *general fatness* (area lemak di lengan, paha, dan pinggang), muskularitas terutama di paha, dan ukuran tubuh (area tulang paha).[12,13]

Penelitian mengenai hubungan hs-CRP dengan HbA1c dan IMT yang dikaitkan dengan risiko kardiovaskular dan DMT2 pada subjek sehat belum banyak dilaporkan. Penelitian ini lebih menekankan

pada evaluasi hubungan hs-CRP dengan HbA1c dan IMT pada suatu komunitas sebagai sebuah studi surveilans pada populasi sehat.

2. Metode

Penelitian ini menggunakan desain potong lintang dengan pengambilan data sekunder dari pelaksanaan program pengabdian masyarakat "Memasyarakatkan Hidup Bugar sebagai Pencegahan Penyakit Jantung dan Diabetes bagi Karyawan KPTU FK-UGM" yang diselenggarakan oleh Departemen Patologi Klinik dan Kedokteran Laboratorium bekerja-sama dengan Departemen Fisiologi pada bulan Juli 2017 di lingkungan Fakultas Kedokteran, Kesehatan Masyarakat, dan Keperawatan (FK-KMK) Universitas Gadjah Mada (UGM). Populasi penelitian ini adalah seluruh peserta program "Memasyarakatkan Hidup Bugar sebagai Pencegahan Penyakit Jantung dan Diabetes bagi Karyawan KPTU FK-UGM" yang telah bersedia mengikuti program dan menyatakan persetujuan dengan *informed consent*. Protokol penelitian ini telah disetujui oleh Komisi Etik FK-KMK UGM dengan nomor referensi KE/FK/0141/EC/2019 dan dinyatakan telah sesuai dengan prinsip etika yang ada pada Deklarasi Helsinki 2013.

Peserta yang setuju mengikuti penelitian dan tidak memiliki tanda dan gejala infeksi berdasarkan anamnesis singkat diikutsertakan dalam analisis. Sedangkan peserta yang pada saat pengambilan sampel darah memiliki tanda dan gejala infeksi dieksklusi.

Pengambilan sampel darah vena dilakukan oleh petugas laboratorium yang terampil. Sampel darah diambil dari vena mediana cubiti kemudian dimasukkan ke dalam 2 tabung yang berbeda, tabung dengan antikoagulan EDTA dan tabung dengan *clot activator*. Pengukuran HbA1c pada darah EDTA dilakukan dengan metode *High Performance Liquid Chromatography* (HPLC) menggunakan *hemoglobin analyzer* Biorad D-10. Metode *enzyme-linked immunosorbent assay* (ELISA) manual diterapkan untuk mengetahui kadar hs-CRP pada serum.

Karakteristik data subjek penelitian meliputi jenis kelamin, usia, indeks massa tubuh, kadar HbA1c dan hs-CRP disajikan sesuai jenis datanya. Data numerik disajikan dengan rerata dan simpang baku sedangkan data nominal disajikan dalam bentuk persentase. Subjek akan dibagi berdasarkan nilai kategori risiko penyakit kardiovaskular dan IMT-nya. Pengolahan data dilakukan dengan program statistik SPSS v.23 menggunakan analisis uji beda untuk menilai perbedaan parameter HbA1c dan hs-CRP di antara kelompok uji. Selanjutnya, dilakukan uji korelasi antara hs-CRP dengan IMT dan HbA1c. Nilai $p < 0,05$ dianggap bermakna secara statistik.

3. Hasil

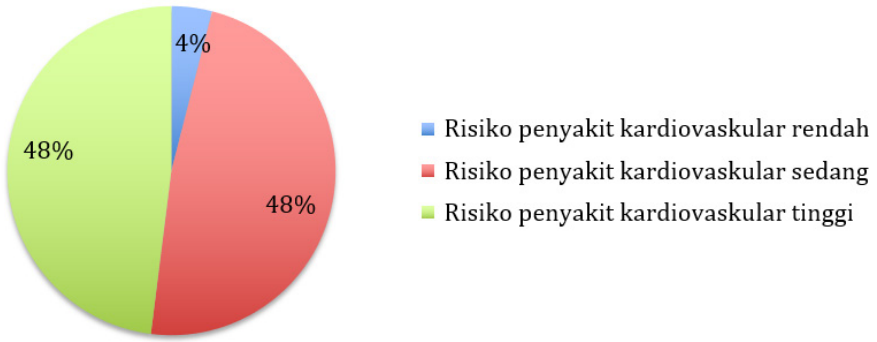
Jumlah subjek penelitian ini sebanyak 25 orang yang semuanya merupakan peserta program pengabdian masyarakat dari Departemen Patologi Klinik dan Kedokteran Laboratorium bekerja sama dengan Departemen Fisiologi bertajuk "Memasyarakatkan Hidup Bugar sebagai Pencegahan Penyakit Jantung dan Diabetes bagi Karyawan KPTU FK-KMK UGM". Karakteristik subjek penelitian tercantum dalam Tabel 1. Variabel penelitian yaitu usia, HbA1c, dan hs-CRP tidak memiliki distribusi data yang normal sehingga data disajikan dalam median (minimum-maksimum) sedangkan variabel IMT memiliki distribusi data normal sehingga disajikan dalam rerata ± simpang baku.

Semua subjek penelitian berjenis kelamin laki-laki dengan median usia 45 tahun (usia termuda 26 tahun dan usia tertua 55 tahun) sehingga semua subjek penelitian adalah subjek dewasa. Hasil pengukuran antropometri menunjukkan rerata IMT 23,99 kg/m^2 dengan 15 (60%) subjek termasuk dalam kategori IMT normal dan tidak ada subjek dengan IMT di bawah normal. Hasil pengukuran HbA1c pada semua subjek menunjukkan bahwa hampir semua subjek penelitian memiliki kadar di bawah 6,5% dan hanya 1 subjek yang mempunyai kadar HbA1c tinggi, yaitu 7,2% dan termasuk dalam kriteria diagnostik untuk diabetes mellitus (> 6,5%). Median kadar hs-CRP pada subjek penelitian adalah 2,99 mg/L dengan rentang 0,81 hingga 13,74 mg/L. Apabila subjek penelitian dibagi ke dalam kategori-

Tabel 1. Karakteristik subjek penelitian (n=25)

Karakteristik subjek		Rentang normal
Jenis Kelamin		
Laki-laki, n (%)	25 (100)	-
Perempuan, n (%)	0 (0)	-
Usia (tahun)*	45 (26-55)	-
HbA1c (%)*	5,30 (4,80-7,20)	<5.7%
Indeks Massa Tubuh (kg/m^2)**	23,99 ±2,71	<23
hsCRP (mg/L)*	2,99 (0,81-13,74)	<1

*: data disajikan dalam median (minimum-maksimum); **: data disajikan dalam rerata ± simpang baku



Gambar 1. Proporsi subjek penelitian sesuai risiko penyakit kardiovaskular berdasarkan kadar hsCRP (risiko rendah <1 mg/L; risiko sedang 1-3 mg/L; risiko tinggi >3 m/L)

kategori risiko penyakit kardiovaskular berdasarkan kadar hs-CRP, maka terdapat masing-masing 12 subjek (48%) masuk ke dalam risiko pemnyakit kardiovaskular sedang dan tinggi (dengan kadar hs-CRP 1-3 mg/L dan > 3 mg/L berturut-turut). Subjek dengan risiko rendah hanya 4% (Gambar 1).

Berdasarkan IMT, subjek penelitian dibagi menjadi dua kelompok yaitu, IMT normal dan *overweight* dengan titik potong pada 25 kg/m^2. Tidak didapatkan perbedaan bermakna kadar HbA1c pada kedua kelompok uji (5,25 mg/L vs. 5,35 mg/L; p>0,05). Median kadar hs-CRP memang lebih tinggi pada kelompok subjek *overweight* namun secara statistik tidaklah bermakna (3,44 mg/L vs. 2,94 mg/L; p>0,05) (lihat Tabel 2; Gambar 2 dan 3).

Analisis korelasi *Spearman* dilakukan pada variabel hs-CRP dengan HbA1c dan didapatkan korelasi yang lemah serta tidak bermakna secara statistik (r=0,35; p = 0,868). Hasil yang sama juga dijumpai antara variabel hs-CRP dengan IMT, di mana korelasi antara keduanya tidak bermakna.

4. Pembahasan

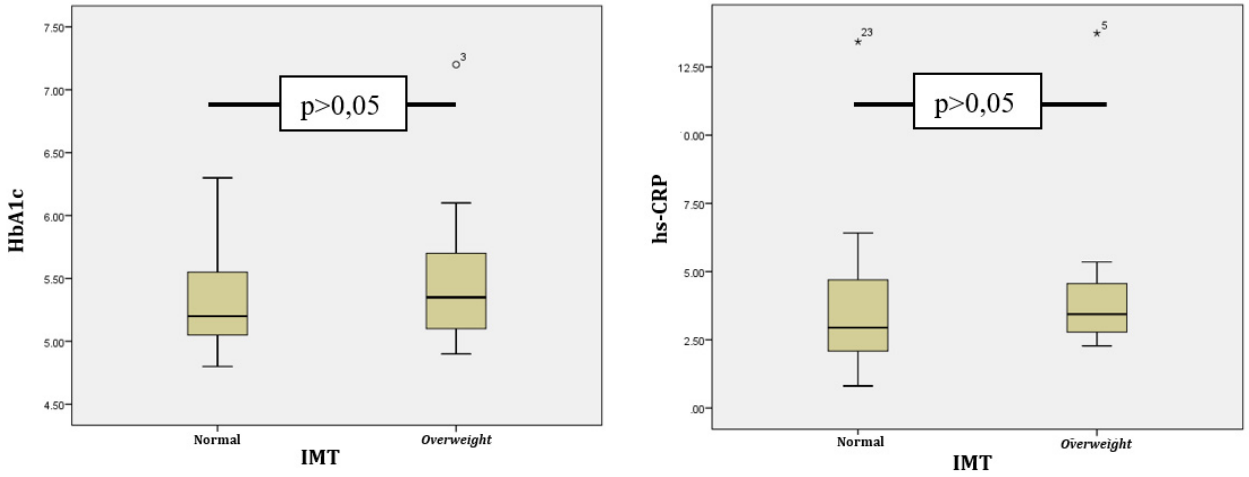
Obesitas telah diketahui berhubungan dengan peningkatan risiko penyakit kardiovaskular, seperti hipertensi, hiperlipidemia, diabetes dan penyakit jantung koroner. Ding *et al.*[14] melaporkan bahwa pasien dengan berat badan kurang (IMT < 18,5 kg/m^2) dan obesitas (IMT > 28 kg/m^2) memiliki risiko yang lebih tinggi dari semua penyebab dan kematian akibat penyakit kardiovaskular.

Pada penelitian ini, tidak ada subjek yang termasuk dalam kategori obesitas. Enam puluh persen subjek termasuk dalam batas normal (rerata IMT 23,99 kg/m^2). Namun demikian, faktor risiko lain seperti gaya hidup, makanan, atau

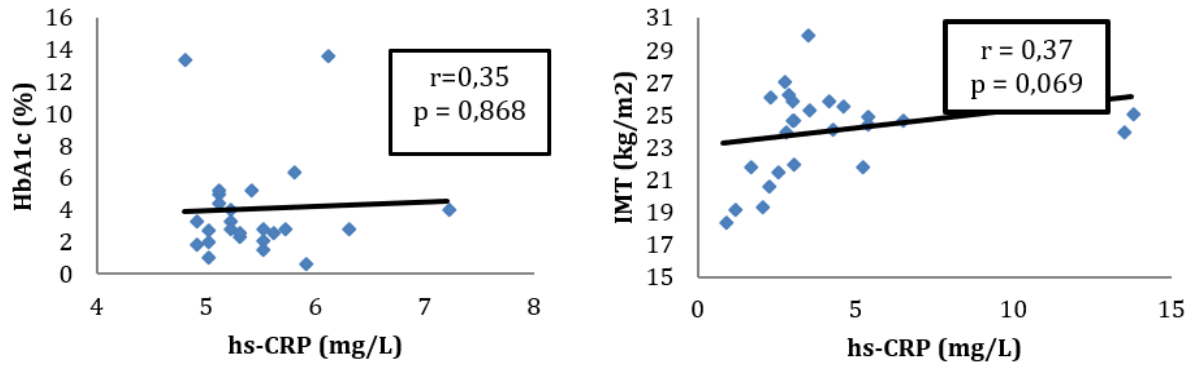
Tabel 2. Beda median HbA1c dan hs-CRP berdasarkan kategori indeks massa tubuh

Parameter kimia	Kategori IMT		*p**
	Normal (n=15)	*Overweight* (n=10)	
HbA1c (%)	5,2 (4,8-6,3)	5,35 (4,8-7,2)	0,311
Hs-CRP (mg/L)	2,94 (0,81-13,43)	3,44 (2,28-13	0,65

*: uji beda *Mann Whitney*



Gambar 2. *Boxplot* kadar HbA1c dan hs-CRP pada kelompok IMT normal dan overweight



Gambar 3. Analisis korelasi kadar hs-CRP dengan nilai HbA1c dan IMT

merokok tidak dapat diabaikan. Studi ini tidak melakukan investigasi mendalam mengenai latar belakang subjek, sehingga faktor risiko tersebut tidak diketahui.

Diabetes melitus juga diketahui turut berkontribusi pada meningkatnya risiko penyakit kardiovaskular melalui kejadian aterosklerosis. Salah satu parameter pemeriksaan untuk mengetahui kadar gula darah dalam tubuh dalam jangka waktu 3 bulan adalah HbA1c. Investigasi HbA1c yang dilakukan dalam penelitian ini menunjukkan bahwa sebagian besar subjek (24 dari total 25 subjek) tidak memenuhi kriteria diabetes melitus. Analisis Mann Whitney antara level HbA1c dengan IMT pada penelitian ini mengindikasikan bahwa tidak terdapat perbedaan bermakna antara subjek yang memiliki IMT normal dengan subjek yang *overweight* (Tabel 2). Arai *et al.*[15] dalam studinya melaporkan pula bahwa HbA1c tidak memiliki hubungan bermakna dengan IMT (p = 0,702).

CRP secara langsung berikatan dengan *oxidized low-density lipoprotein cholesterol* (LDL-C) yang aterogenik dan terdapat di dalam plak yang mengandung lipid[16,17]. Berdasarkan hal tersebut, pemeriksaan hs-CRP dapat digunakan sebagai biomarker untuk memprediksi risiko penyakit jantung pada seseorang yang sehat. Berdasarkan kadar hs-CRP, *American Heart Association* membagi risiko ke dalam 4 kelompok yaitu risiko rendah (hs-CRP < 1 mg/l), risiko sedang (hs-CRP 1-3 mg/l), risiko tinggi (hs-CRP 3-10 mg/l) dan peningkatan tidak spesifik (hs-CRP > 10 mg/l)[18,19]. Penelitian pada sebuah komunitas di Skotlandia[5] melaporkan bahwa konsentrasi CRP merupakan prediktor bermakna diabetes pada laki-laki usia menengah.

Studi komunitas ini secara tidak terduga menunjukkan hasil bahwa subjek penelitian sebagian besar berada pada risiko kardiovaskular sedang dan risiko tinggi (Gambar 1). Saat level hs-CRP dikorelasikan dengan IMT, keduanya menunjukkan hubungan yang tidak bermakna. Hasil serupa juga didapatkan pada analisis korelasi antara hs-CRP dengan HbA1c (Gambar 3). Hasil tersebut bertentangan dengan beberapa hasil penelitian yang melaporkan bahwa peningkatan CRP dikaitkan dengan insulin dan HbA1c yang lebih tinggi di antara pria dan wanita[20-22].

Hasil penelitian ini kami sampaikan kepada semua subjek dan kami sampaikan kepada seluruh subjek yang terlibat untuk datang pada pertemuan dengan narasumber yang memberi informasi tentang kesehatan dan pencegahan penyakit kardiovaskular.

Kurangnya penilaian lingkar perut, analisis antropometri, dan jumlah subjek merupakan keterbatasan penelitian ini. Penelitian lebih lanjut dengan jumlah subjek yang lebih besar dan disertai analisis sindrom metabolik diperlukan

5. Kesimpulan

Populasi sehat dalam penelitian ini memiliki rerata IMT yang termasuk dalam kategori *overweight* meskipun sebagian besar masuk dalam kategori normal. Selain itu, juga didapatkan 1 subjek yang memiliki kriteria diagnostik diabetes (HbA1c > 6,5). Hal yang mengejutkan adalah penemuan bahwa hampir semua subjek penelitian (96%) memiliki risiko terhadap kejadian penyakit kardiovaskular. Tidak ditemukan hubungan antara hs-CRP baik dengan HbA1c maupun IMT pada populasi sehat dalam penelitian ini. Oleh karena itu, penggunaan monitoring parameter lain seperti profil lipid dan glukosa darah juga penting dalam memprediksi risiko kardiovaskular pada populasi sehat.

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Konflik kepentingan

Penulis menyatakan tidak ada konflik kepentingan dengan pihak-pihak yang terkait dalam penelitian ini.

Daftar pustaka

1. Donath MY dan Shoelson SE. Type 2 diabetes as an inflammatory disease. Nature Reviews *Immunology* 2011; 11(2):98–107.
2. Marikka Kuoppamaki, Marika Salminen, Tero Vahlberg, Kerttu Irjala, Sirkka-Liisa Kivela, Ismo Raiha. High sensitive C-reactive protein (hsCRP), cardiovascular events and mortality in the aged: A prospective 9-year follow-up study. *Archives of Gerontology and Geriatrics* 2015; 60:112–117
3. Alexandra D. Ogorodnikova, Mimi Kim, Aileen P. McGinn, Paul Muntner, Unab Khan and Rachel P. Wildman. Incident cardiovascular Disease Events in Metabolically Benign Obese Individuals. *Obesity* 2012; 20:651–659. doi:10.1038/oby.2011.243

4. Dekker JM, Girman C, Rhodes T, Nijpels G; Coen D, Stehouwer A, Bouter LM, Heine RJ. Metabolic Syndrome and 10-Year Cardiovascular Disease Risk in the Hoorn Study. *Circulation* 2005; 112:666-673.
5. Freeman DJ, Norrie J, Caslake MJ, *et al.* C-reactive protein is an independent predictor of risk for the development of diabetes in the west of Scotland Coronary Prevention Study. *Diabetes* 2002; 51(5):1596–1600.
6. Pearson TA, Mensah GA, Alexander RW, Anderson JL, Cannon RO 3rd, Criqui M, Fadl YY, Fortmann SP, Hong Y, Myers GL, Rifai N, Smith SC Jr, Taubert K, Tracy RP, Vinicor F; Centers for Disease Control and Prevention; American Heart Association: Markers of inflammation and cardiovascular disease: application to clinical and public health practice. A statement for health care professionals from the Centers for Disease Control and Prevention and the American Heart Association. *Circulation* 2003; 107:499–511.
7. Schaumberg DA, Glynn RJ, Jenkins AJ, Lyons TJ, Rifai N, Manson JE, Ridker PM, Nathan DM: Effect of intensive glycemic control on levels of markers of inflammation in type 1 diabetes mellitus in the Diabetes Control and Complications Trial. *Circulation* 2005; 111:2446–2453
8. King DE, Mainous AG III, Buchanan TA, Pearson WS: C-reactive protein and glycemic control in adults with diabetes. *Diabetes Care* 2003;26:1535–1539
9. Wu T, Dorn JP, Donahue RP, Sempos CT, Trevisan M. Associations of Serum C-reactive Protein with Fasting Insulin, Glucose, and Glycosylated Hemoglobin: The Third National Health and Nutrition Examination Survey, 1988–1994. *American Journal of Epidemiology*, 2002; 155(1): 65–71.
10. DeFronzo RA. Pathogenesis of Type 2 Diabetes Mellitus. *Med Clin North Am*, 2004; 88:787-835.
11. Vazquez G, Duval S, Jacobs DR, Silventoinen K. Comparison of Body Mass Index, Waist Circumference, Waist/Hip Ratio in Predicting Incident Diabetes : A Meta-Analysis. *Epidemio Rev*, 2007; 29:115-128.
12. Soo In Choi, Dawn Chung, Jung Soo Lim, Mi Young Lee, Jang Yel Shin, Choon Hee Chung, Ji Hye Huh. Relationship between Regional Body Fat Distribution and Diabetes Mellitus: 2008 to 2010 Korean National Health and Nutrition Examination Surveys. *Diabetes Metab J* 2017;41:51-59. https://doi.org/10.4093/dmj.2017.41.1.51
13. Danila Diano, Federico Ponti, Sara Guerri, Daniele Mercatelli, Michele Amadori, Maria Pilar Aparisi Gómez, Giuseppe Battista, Giuseppe Guglielmi, Alberto Bazzocchi. Upper and lower limbs composition: a comparison between anthropometry and dual-energy X-ray absorptiometry in healthy people. *Arch Osteoporos* 2017; 12:78. DOI 10.1007/s11657-017-0374-8
14. Ding D, Wang M, Su D, Hong C, Li X, Yang Y, et al. Body Mass Index, High-Sensitivity C- Reactive Protein and Mortality in Chinese with Coronary Artery Disease. *PLoS ONE* 2015; 10(8): e0135713. doi:10.1371/journal.pone.0135713.
15. Keiko Arai, Hiroki Yokoyama, Fuminobu Okuguchi, Katsuya Yamazaki, et al. Association between Body Mass Index and Core Components of Metabolic Syndrome in 1486 Patients with Type 1 Diabetes Mellitus in Japan (JDDM 13). *Endocrine Journal* 2008, 55 (6), 1025–1032.
16. Omair Yousuf, Bibhu D. Mohanty, Seth S. Martin, Parag H. Joshi, et al. High-Sensitivity C-Reactive Protein and Cardiovascular Disease - A Resolute Belief or an Elusive Link? *J Am Coll Cardiol* 2013;62:397–408
17. Kansui Y, Matsumura K, Morinaga Y, et al. C-reactive protein and incident hypertension in a worksite population of Japanese men. *J Clin Hypertens*. 2019;00:1–9. Doi: 10.1111/jch.13510
18. Seyedian SM, Ahmadi F, Dabagh R, Davoodzadeh H. Relationship between high-sensitivity C-reactive protein serum levels and

the severity of coronary artery stenosis in patients with coronary artery disease. *ARYA Atheroscler* 2016; 12(5): 231-7.

19. Ridker PM. High-sensitivity C-reactive protein: potential adjunct for global risk assessment in the primary prevention of cardiovascular disease. *Circulation*. 2001;103(13):1813-8.
20. Yao Liu, Yan-min Yang, Jun Zhu, Hui-qiong Tan, Yan Liang and Jian-dong Li. Prognostic significance of haemoglobin A1c level in patients hospitalized with coronary artery disease. A systematic review and meta-analysis. *Cardiovascular Diabetology* 2011, 10:98
21. Tiejian Wu, Joan P. Dorn, Richard P. Donahue, Christopher T. Sempos, and Maurizio Trevisan. Associations of Serum C-reactive Protein with Fasting Insulin, Glucose, and Glycosylated Hemoglobin. *Am J Epidemiol* 2002;155:65–71.
22. K. Norimatsu, S.i Miura, Y. Suematsu, Y. Shiga, Y. Miyase, A. Nakamura, M. Yamada, A. Matsunaga, K. Saku. Associations between glycated albumin or hemoglobin A1c and the presence of coronary artery disease. *Journal of Cardiology* 2015; 65:487–493

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Initiation of *Sekolah Sadar Gizi* by conducting nutritional status assessment and nutritional education to junior high school student

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ABSTRACT School is a strategic place to form nutrition behaviors of the students, for example by initiating Sekolah Sadar Gizi (Nutrition Awareness School). The first step to initiate Sekolah Sadar Gizi is collecting the nutrition situation data of the students. Nutrition education and nutritional status assessment are examples of how the data can be collected. This is a community services program aimed to provide the nutrition situation of the students and to educate the students to initiate Sekolah Sadar Gizi. The activities were conducted in August – October 2017 at Muhammadiyah 3 Junior High School. There were 2 main activities, nutritional status assessment, and nutrition education. The results show that over-nutritional and under-nutritional problem happened in all classes, either class 7, 8, or 9. The highest number of stunted and obese children is in class 8 which was around 7% and 15%. Meanwhile, the number of wasted children was around 5% and obese children were around 20%. From nutrition education which followed by Palang Merah Remaja of the school, the score of 60% of the participants was increasing. Considering the burden of nutritional problems in the school, initiation of Sekolah Sadar Gizi is highly recommended.

KEYWORDS sekolah sadar gizi; nutrition education; nutrition assessment; obesity; stunting; wasting

1. Introduction

School is a potential place to improve knowledge, attitude, and community practice about balanced nutrition.[1] Knowledge and nutrition-related information are the urgent needs to create a productive and healthy generation in the future. A review by Wang and Stewart[2] stated that friends of the same age and the types of foods provided are more influential towards nutritional behavior of the students than the influence of the parents. A full-day school program which is applied at some schools in Indonesia should be balanced with the provision of healthy and nutritious facilities and food in schools.

One of the health promotion activities at school is creating *Sekolah Sadar Gizi* or Nutrition Awareness School. This activity is inspired by *Keluarga Sadar Gizi* program which is focused on the improvement of nutrition behavior of the family. *Sekolah Sadar Gizi* focuses on the nutritional status, students' health, and increasing the role

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of nutrition that supports children's learning achievement. Nutrition promotion at school. Nutrition promotion in schools can also be done by trying to create a conducive environment so that children can choose healthy foods over non-healthy ones. The ability of children to choose healthy foods independently is expected to reduce morbidity and mortality related to malnutrition, obesity, and nutritional deficiencies.[2]

Initializing of *Sekolah Sadar Gizi* can be done with healthy school assessment tools based on the *Monitoring and Evaluation Guidance for School Health Program* prepared by The United Nations Children's Fund (UNICEF) and World Health Organization (WHO). This concept not only assesses the nutritional status of the students but also assesses the school environment and local health services in supporting *Sekolah Sadar Gizi.* [3]

According to Nutritional Status Assessment year 2016, there are still many school-related nutritional problems that happened to children and adolescents. National prevalence of wasted children aged 5-12 years old were 7.8% while severely wasted was 2.7%. In adolescents aged 13-15 years old, the problem of wasted was 7.4% while severely wasted was 2.4% nationally. Meanwhile, special region of Yogyakarta, the prevalence of wasted children aged 5-12 years old even exceeding the national prevalence with the number of 8.7% and so do the prevalence of wasted adolescent with the number of 8.4%.[4] The data reflects the magnitude of nutritional problems that occur among school students in Indonesia, especially in Yogyakarta. Therefore, monitoring nutritional status needs to be done on school students to find out the magnitude of the problems that occur in each school.

Muhammadiyah 3 Junior High School is one of the junior high schools in Yogyakarta province. This school has been established since 1951 and is now known as one of the International Islamic Schools in Indonesia. As one of the role models that has an Islamic education background, Muhammadiyah 3 is suitable to be used as a pilot project in initiating the *Sekolah Sadar Gizi* program.

Knowledge about students' nutritional status is important to determine the strategic intervention for the students. Therefore, this community empowerment which was carried out at Muhammadiyah 3 Yogyakarta Junior High School had 3 objectives, as follows: 1) providing data on students' nutritional situation to school, 2) increasing the awareness of students and other school members about the importance of implementing good nutritional behavior, and 3) provide nutrition education for students.

2. Methods

This community empowerment carried out at Muhammadiyah 3 Yogyakarta Junior High School in August – October 2017. There were several processes including preparation, implementation, and evaluation process. Several activities on preparation phase were as follows 1) situation analysis, 2) program planning, 3) coordination with school management, and 4) preparing equipment and materials to be used. After preparation, stages of implementation are carried out with 2 methods, namely assessment of nutritional status and nutritional education. The next stage is evaluation and analysis of data so that it becomes useful information.

Examination of students' nutritional status was conducted towards students of 7th, 8th, and 9th-grade of Muhammadiyah 3 Yogyakarta Junior High School. Assessment carried out included measurements of height, weight, and body mass index. Measurement of body weight using a digital scale with a precision level of 0.01 kg while measuring height using stature meter with a precision level of 0.01 cm. From the data, the researcher calculated height for age z-score (HAZ) and body mass index for age z-score (BAZ) using *software* WHO Anthro Plus. The value of HAZ used to determine whether the child is stunting or not while the BAZ is used to determine whether the child is overweight, normal, or underweight.

Nutrition education is given to student representatives who joined the Youth Red Cross organization of Muhammadiyah 3 Yogyakarta.

Nutritional education was carried out with counseling methods and included 3 materials, 1) anemia in adolescents, 2) measurement of body weight and height, and 3) balanced nutrition in adolescents, first aid in accidents, and clean and healthy lifestyle. The success of nutritional education is measured by giving pretest and post-test questions and is called successful if more than 50% of extension participants experience an increased value.

Statistical analysis is only done on nutritional status assessment data. Analysis using One-Way ANOVA was carried out to determine differences in the values of body weight, height, body mass index, and anthropometric index between 7th, 8th, and 9th-grade students. The results of the interpretation of the nutritional status of students as well as the pretest and posttest were not analyzed statistically but descriptively.

3. Results

3.1 Nutritional assessment

The nutritional status assessment of 560 students was categorized as 7th-grade (137 students), 8th-grade (226 students), and 9th-grade (197 students) by measuring height for age z-score (HAZ) and body mass index for age z-score (BAZ). Based on the assessment of nutritional status, it was known that malnutrition occurred in all classes (Table 1). The most nutritional problems occurred in 8th-grade students, such as stunting as much as 7.08% and obese as much as 15.49%. Under- and overnutrition problems occur in almost the same amount in each class group. However, the highest number of underweight students was in the group of 9th-grade students (5.58%) and the highest number of obese students was in the group of 7th-grade students (21.90%).

From table 2**,** it can be seen the higher the level of the student class, there was a significant increase in height and weight ($p < 0.05$). The body mass index of student also experienced an increase even though it was not statistically significant.

3.2 Nutrition education

Nutrition education was conducted on 61 students who joined the Youth Red Cross. Based on the assessment before and after counseling, it was

Table 1. Frequency distribution of nutritional status class 7, 8, and 9

Class 7 (n= 137)		**Body mass index for age (BAZ)**				
		Wasted (%)	**Normal (%)**	**Overweight (%)**	**Obese (%)**	**Total HAZ (%)**
Height for age z-score (HAZ)	Stunting	0 (0.00)	6 (4.38)	0 (0.00)	0 (0.00)	6 (4.38)
	Normal	7 (5.11)	74 (54.01)	30 (21.90)	20 (14.6)	131 (95.62)
	Total BAZ (%)	7 (5.11)	80 (58.39)	30 (21.90)	20 (14.6)	137 (100.00)
Class 8 (n= 226)						
Height for age z-score (HAZ)	Stunting	1 (0.44)	14 (6.19)	0 (0.00)	1 (0.44)	16 (7.08)
	Normal	9 (3.98)	121 (53.54)	46 (20.35)	34 (15.04)	210 (92.92)
	Total BAZ (%)	10 (4.42)	135 (59.73)	46 (20.35)	35 (15.49)	226 (100.00)
Class 9 (n=197)						
Height for age z-score (HAZ)	Stunting	0 (0.00)	4 (2.03)	0 (0.00)	2 (1.01)	6 (3.04)
	Normal	11 (5.58)	120 (60.91)	40 (20.3)	20 (10.15)	191 (96.95)
	Total BAZ (%)	11 (5.58)	124 (62.94)	40 (20.3)	22 (11.17)	197 (100.00)

Table 2. Anthropometric and index anthropometric assessment

Class	Height (cm)	Weight (kg)	BMI (kg/m²)	HAZ	BAZ
7	151.83 ± 10.36[a]	48.14 ± 13.33[a]	20.30 ± 4.98	-0.35 ± 0.96	0.63 ± 3.18
8	156.26 ± 7.60[b]	51.84 ± 1.35[b]	20.99 ± 4.76	-0.56 ± 0.96	0.49 ± 1.92
9	160.61 ± 7.41[c]	55.19 ± 12.52[c]	21.35 ± 4.50	-0.52 ± 0.83	0.24 ± 1.40
	<0.001	<0.001	0.132	0.091	0.236

One-Way ANOVA*, post hoc* Bonferroni. Data shown as mean ± standard deviation (SD)

[a,b] Different superscript in the same column shows significant difference

BMI: body mass index; HAZ: height for age z-score; BAZ: body mass index for age z-score

Table 3. Knowledge comparison after nutrition education

Level	n (%)	Pretest average	Posttest average
Low	3 (4.91)	73.33	63.33
Constant	12 (19.67)	77.50	77.50
Increase	46 (75.41)	65.00	86.96
Total	61 (100.00)	67.87	83.93

found that 75.4% of students experienced an increase in the value of the pretest and post-test (Table 3). Only 5% of students experienced a decline in value and 19.7% of students experienced no change in value.

4. Discussion

Based on the research that has been done, it is known that nutritional problems occur evenly in all class groups. Among 560 students who took part in this activity, it was known that 24 students (4.28%) were stunted, 1 student (0.18%) was stunted and underweight, 3 students (0.54%) were stunted and obese, 27 students (4.82%) were underweight, 116 students (20.71%) were overweight, and 74 students (13.21%) were obese.

Stunting is a cumulative effect that occurs due to malnutrition since the first 1000 of life and is indicated by the height lower than 2 standard deviations from the average height of other children in his age group.[5] Data of Nutritional Status Monitoring year 2016 towards 12-18 years old female adolescents showed that 24.1% of them were stunted and 7.5% were severely stunted.[4] Other studies in Jakarta towards 141 primary school children showed 44% were stunting.[6]

The condition of stunting are affected by nutritional status of the mother, economic situation and family demographics, births disparity, infections that occur in infants, and hygiene-sanitation problems.[7-9] According to Dominguez[10], the effect of interventions to combat stunting in children over 2 years does not effects as large as when children are under 2 years old. However, several ways can be pursued to improve the quality of life of stunted children, include conducting nutrition education for mothers, paying attention to children's nutritional intake, strengthening the function of nutritional counseling and health care facilities, especially at schools and primary health facilities.[11, 12]

Some respondents of this activity are known to experience the double burden of malnutrition, whether stunting and underweight or obese and stunting. This condition is likely due to poor nutrition management in stunting toddlers, causing them to experience a double burden of malnutrition when they are teenagers. Thinness or wasting can occur due to inadequate energy intake in children. This is characterized by weight for age z-score index (WAZ) lower than -2 SD from the average population of the same age.[9] As for obesity occurs because of excess

energy intake. In children and adolescents, the condition of obesity can be determined according to the body mass index for age (BAZ) above +2SD from the average population.[13] According to the WHO 2007 growth chart reference, the minimum height suitable for 13-year-old girls is 143 cm while for young men it is estimated to be 142 cm. The normal body mass index for female adolescents aged 13 years is approximately 15 – 21.5 kg/m^2 while for male adolescents ranged from 15 – 20.8 kg/m^2.[14]

According to the Global Nutrition Report 2015, stunting and wasting conditions are often found in malnourished children in the world, especially in developing countries.[15] Several studies conducted on toddlers in Tanzania and India also showed a coexistence between stunting and wasting. Given the long-term impacts that can be caused both from stunting and wasting, the intervention provided should not separate wasting and stunting as two different cases, but complementary.[16, 17]

Hoffman et al.[18] prove that stunted children were more at risk of being overweight in adulthood. This was because stunting children tended to experience impaired fat oxidation metabolism. Therefore, stunted children given excessive nutrition would not improve their nutritional status. Excessed nutrition can lead to increased fat deposits in the body so that children are at risk of obesity in adolescence. Overeating behavior would also cause children to have difficulty controlling their appetite.[19]

In this activity, it was known that students who were overweight or obese reached more than 20%. Being overweight often occurs because of more than one factor. Several studies revealed determinant factors of overweight in children and adolescents including socioeconomic factors (mother's occupational status, pocket money, television), nutritional factors (consumption of junk food, overeating patterns), nutritional status of parents, and lack of physical activity.[20-22] Being overweight is very dangerous because it can lead to other diseases. The World Health Organization in 2017 reports that many studies have proven the effect of obesity on the increased risk of type II diabetes mellitus, sleep disorders, hypertension, and cardiovascular disease. Besides, obesity can reduce the quality of life of adolescents, for example in terms of managing emotions and behavior. This report also stated that 4 out of 5 obese adolescents will remain obese in adulthood.[23]

From anthropometric measurements, it is known that the higher the grade level, the more weight and height of the child. This is following the growth theory where the acceleration of growth in adolescents is characterized by changes in body shape, size, and composition, also known as puberty. In general, the acceleration of growth in female adolescents is starting at the age of 11 years while male adolescents are from the age of 13 years.[24] Respondents of this study were students aged 11 and 13 years which in general is the age range of elementary to junior high school students, so it is known that the participants of this community empowerment activity were teenagers who were experiencing puberty.

As much as 75.41% of students experienced an increase in the post-test scores after nutrition education. It could be said that the method of nutrition counseling to increase knowledge had succeeded. However, the increase in post-test scores in this activity does not mean that the knowledge has been or can be applied by the participants in their daily life.

Kong et al., stated that nutrition education is an effective and efficient way to increase students' knowledge about good nutritional behavior.[25] However, nutrition education also has its obstacles and challenges. According to McNulty, challenges faced by the implementation of nutrition education include the availability of competent, sustainable teachers and adjustments to the national curriculum.[26] In addition, a further approach is needed so that the knowledge provided can be applied and become a habit of students. Research conducted by Silveira et al.[27] mentioned that nutrition education accompanied by the practice of eating vegetables and fruit is more effective in reducing the incidence of overweight and obesity.

Data obtained from this activity has several disadvantages. First, the data cannot describe the relationship between variables. This limitation makes it not possible to know the causes of the malnutrition phenomenon among students. Second, nutrition education activities are only carried out at one time (unsustainable) so it is not known whether the nutrition knowledge provided can survive and be practiced by children. Third, nutrition education is targeted to student representatives. It caused not all students get the same knowledge with student representatives. Although the researcher expected there would be sharing knowledge from the representatives to their peers, it could not be assessed.

This data has advantages in terms of the number of children who joined nutritional status assessment. A total of 560 students become respondents consisting of 7th, 8th and 9th graders so that all class groups are represented. This examination could provide baseline nutritional status data for students which showed the urgency of nutrition intervention for the children. This is a strong basis that nutrition education is very necessary both for implementation at the curriculum level or daily life in schools. One method that can be proposed is *Sekolah Sadar Gizi* initiation.

5. Conclusion

The results show that over- and undernutrition remains big problems among students, especially at Muhammadiyah 3 Yogyakarta Junior High School. The implementation of nutrition education is proven to increase students' knowledge. Initiation of *Sekolah Sadar Gizi* is proposed as a method for improving the nutritional status of school children. Further research needs to be done to solve the nutrition-related problems among children and adolescents, especially in the school context.

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Conflict of interest

There are no conflict of interests

References

1. Achadi E, Pujonarti SA, Sudiarti T, Rahmawati, Kusharisupeni, Mardatillah, Putra WKY. Elementary school as the entrance to improved knowledge, attitudes, and balanced nutritional behavior of communities. JKMI. 2010; 5 (1): 42–47.
2. Wang D, Stewart D. The implementation and effectiveness of school-based nutrition promotion programs using a health-promoting schools approach: A systematic review. Public Health Nutrition. 2013; 16 (6): 1082–1100.
3. UNESCO, Save the Children, Education International, EDC, UNODC, AIR, World Bank, World Health Organization, UNICEF, The Partnership fo Child Development. Monitoring and evaluation guidance for school health programs: eight core indicators to support FRESH (Focusing Resources on Effective School Health). 2014.
4. Ministry of Health Republic of Indonesia. Result and explanation of nutritional status assessment year 2016. Jakarta: Directorate of Community Nutrition, Ministry of Health RI. 2017.
5. World Health Organization. Nutrition Landscape Information System (NLIS): Country Profile Indicators Interpretation Guide. 2010.
6. Arfines PP, Puspitasari FD. The relation between stunting and learning achievement of elementary school children in Slum Area, Central Jakarta Municipality. Buletin Penelitian Kesehatan. 2017; 45 (1): 45–52.
7. Chirande L, Charwe D, Mbwana H, Victor R, Kimboka S, Issaka AI, Agho KE. Determinants of stunting and severe stunting among under-fives in Tanzania: Evidence from the 2010 Cross-Sectional Household Survey. BMC Pediatrics. 2015; 15 (1): 1–13.
8. Torlesse H, Cronin AA, Sebayang SK, Nandy R. Determinants of stunting in Indonesian children: evidence from a cross-sectional

survey indicate a prominent role for the water, sanitation and hygiene sector in stunting reduction. BMC Public Health. 2016; 16 (1): 1–11.

9. Svefors P. Stunted growth in children from fetal life to adolescence (digital co). Uppsala: Acta Universitatis Upsaliensis. 2018.
10. Dominguez EI. Babywash and the 1000 days, a practical package for stunting reduction: contribution to malnutrition reduction through a multi-sector approach. Global Health Professional. 2017.
11. World Health Organization. Nutrition in adolescence: issues and challenges for the health sector: issues in adolescent health and development. Geneva: World Health Organization. 2005.
12. Woday A, Menber Y, Tsegaye D. Prevalence of and associated factors of stunting among adolescents in Tehuledere District, North East Ethiopia. Journal of Clinical & Cellular Immunology. 2018; 9 (2).
13. World Health Organization. Global Strategy on Diet, Physical Activity and Health. 2003.
14. World Health Organization. Growth Reference Data for 5-19 Years. 2007.
15. International Food Policy Research Institute. Global Nutrition Report 2015: actions and accountability to advance nutrition and sustainable development. Washington, DC. 2015.
16. Mgongo M, Chotta NAS, Hashim TH, Uriyo JG, Damian DJ, Stray-Pedersen B, Vangen S. Underweight, stunting and wasting among children in Kilimanjaro Region, Tanzania; a population-based cross-sectional study. International Journal of Environmental Research and Public Health. 2017; 14(5): 1–12.
17. Harding KL, Aguayo VM, Webb P. Factors associated with wasting among children under five years old in South Asia: Implications for Action. PLoS ONE. 2018; 13(7): 1–17.
18. Hoffman DJ, Sawaya AL, Verreschi I, Tucker KL, Roberts SB. Why are nutritionally stunted children at increased risk of obesity? Studies of metabolic rate and fat oxidation in Shanty town children from São Paulo, Brazil. American Journal of Clinical Nutrition. 2000; 72 (3): 702–707.
19. Amin T, Mercer JG. Hunger and satiety mechanisms and their potential exploitation in the regulation of food intake. Current Obesity Reports. 2016; 5 (1): 106–112.
20. Junaibi A. Al Abdulle A, Sabri S, Hag-Ali M, Nagelkerke N. The prevalence and potential determinants of obesity among school children and adolescents in Abu Dhabi, United Arab Emirates. International Journal of Obesity. 2013; 37 (1): 68–74.
21. Taha AA, Marawan HM. Socio-behavioral Determinants of Overweight and Obesity in Egyptian Primary School Children cited in Rogol AD, Clark PA, Roemmich JN. Growth and pubertal development in children and adolescents: effects of diet and physical activity. American Journal of Clinical Nutrition. 2015. 72 (supplement): 521S–528S.
22. Lateef OJ, Njogu E, Kiplamai F, Haruna US, Lawal RA. Determinants of overweight and obesity among adolescent students in public secondary schools in Kwara State, Nigeria. Current Research in Nutrition and Food Science Journal. 2016; 4 (2): 96–106.
23. World Health Organization. Adolescent obesity and related behaviours: trends and inequalities in the WHO European region, 2002–2014. Geneva: World Health Organization. 2017.
24. Tanner JM, Whitehouse RH, Marshall WA, Carter BS. Prediction of adult height from height, bone age, and occurrence of menarche, at ages 4 to 16 with allowance for midparent height. Archives of Disease in Childhood. 1975; 50 (1): 14–26.
25. Kong K, Liu J, Tao Y. Limitations of studies on school-based nutrition education interventions for obesity in China: a systematic review and meta-analysis. Asia Pacific Journal of Clinical Nutrition. 2016; 25 (3): 589–601.
26. McNulty J. *Challenges and Issues in Nutrition Education*. Rome. 2013.
27. Silveira JAC, Taddei JAAC, Guerra PH, Nobre MRC. Effectiveness of school-based nutrition education interventions to prevent and reduce excessive weight gain in children and adolescents: a systematic review. Journal de Pediatria. 2011; 87 (5): 382–392.

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Survey of basic life support knowledge in security officer of the company along The Daendles Highway

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ABSTRACT Giving first aid to traffic accident victims are often not carried out by medical personnel or competent people. The first helper in traffic accidents on the Daendles Highway is the neighboring community and security officers. The purpose of this study was to describe the knowledge level of security officers concerning basic life support in order to give first aid for the accidents along the Daendles Highway of Manyar Subdistrict, Gresik. This study used a descriptive design with a cross-sectional approach. The respondents in this study were 45 security officers of the company, which is spread along the Daendles Highway of Manyar Subdistrict, Gresik, East Java. The sample was taken by purposive sampling. Data were taken using questionnaires then analyzed by univariate techniques with SPSS 16. The results showed that security with good knowledge was 31.11%, sufficient knowledge was 55.56%, and insufficient knowledge was 13.33%. The characteristic group of respondents who had good knowledge was aged 26-35 years with a working period of 1-5 years and > 5 years, while the characteristics of the respondents who had insufficient knowledge were aged 36-45 years with a working period of 1-5 years and > 5 years. Increasing knowledge and skill about basic life support are needed to reduce mortality and increase the life expectancy of victims while waiting for help from medical personnel.

KEYWORDS basic life support (BLS); Daendles Highway; East Java; knowledge level; security officer

1. Introduction

One of the biggest deaths in the world is caused by traffic accidents.[1] World Health Organization (WHO) noted 1.35 million people died because of traffic accidents around the world in 2018.[2] The large number of traffic accident victims cause emergency conditions, so they need rapid help at the scene to prevent morbidity and mortality. Giving appropriate pre-hospital care can reduce the risk of death from traffic accidents.[3] However, the provision of first aid to victims of traffic accidents is often not carried out by medical personnel or competent people.

Gresik regency is an inter-city and inter-province protocol road in East Java. One of the inter-city protocol roads is Daendles Highway that connects the city of Gresik with the city of Lamongan and its surroundings or inter-city roads that connect between Manyar Subdistrict and Bungah Subdistrict and its surroundings. Gresik police data noted that the Daendles Highway had occurred 522 accidents in 2016 and increased to 596 accidents in 2017. The death around 175 people and 5 people were seriously injured, and 316 victims suffered minor injuries.[4] The accident occurred at the time of going to school and leaving for work noted 10 times. Then when going home from work with 9 accidents and on Monday noted there were 10 times accidents.[5]

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Victims of accidents can get worse if not treated quickly and can even cause death.[1] Basic life support (BLS) is an effort that did to maintain the life of someone who is under threat. BLS must be given to victims who experience stop breathing, cardiac arrest, and emergency. Communities should be taught about BLS, especially for workers who are often associated with providing safety assistance.[1] Security officers in several companies along the protocol road often conduct assistance to victims of traffic accidents or workplace accidents that experience minor injuries or severe injuries and sometimes also help victims themselves with community assistance not accompanied by medical personnel.

Knowledge of first aid, including BLS that did by security officers needs to be known whether using the right techniques or methods. The purpose of this study was to describe the level of security officers knowledge about basic life support along the Daendles Highway of Manyar Subdistrict, Gresik.

2. Methods

This study was a cross-sectional descriptive study. Data was taken in April 2019 with the entire population was security at the company located along Daendles Highway, Manyar Subdistrict, Gresik Regency, East Java. Respondents who were physical health, who was on duty, and who were willing to participate were included in this study. However, the security who was off work excluded.

For the process of gathering respondents, researchers worked with companies that provide security services, PT Shelter Nusantara, whose employees are spread across several companies along the Daendles Highway. After assessing the criteria, the researcher explained the purpose of the study to the respondents. If they agreed to participate, they signed the informed consent form and answered the questionnaire. There were 45 respondents included in this study.

The data of this study were collected using a questionnaire modified from Annas [6] and Bariqi[7], which had been used in previous studies. Questionnaires consisted of 20 multiple choice questions, which included the definition of first aid (question no.1), the purpose of help first (questions no. 2 and 3), and the first aid method (question no. 4-20). Then the results of the study analyzed using SPSS version 16.

3. Results

The number of samples of this study was 45 respondents. The result shows that the majority of respondents are in the early adult age range (26-23

Table 1. Characteristics of respondents (N=45)

Variable	n	%
Age		
17-25 years	7	15.6
26-35 years	23	51.1
36-45 years	13	28.9
46-55 years	2	4.4
Sex		
Male	45	100,0
Female	0	0,0
Educational status		
Primary school	0	0.0
Secondary school	0	0.0
High school	45	100.0
University	0	0.0
Work experience		
1-5 years	26	57.8
>5 years	19	42.2
Previous BLS training		
Yes	0	0.0
No	45	100.0

BLS: Basic life support

Table 2. Knowledge level of respondents (N=45)

Knowledge level	n	%
Good	14	31,1
Sufficient	25	55,6
Insufficient	6	13,3

Table 3. Knowledge level base on respondents characteristic (N=45)

Variable	Knowledge level, n (%)		
	Good	Sufficient	Insufficient
Age			
17-25 yeras	0 (0)	6 (13,3)	1 (2,2)
26-35 years	8 (17,8)	13 (28,9)	2 (4,4)
36-45 years	6 (13,3)	4 (8,9)	3 (6,7)
46-55 yeras	0 (0)	2 (4,4)	0 (0)
Sex			
Male	14 (31,1)	25 (55,6)	6 (13,3)
Female	0 (0)	0 (0)	0 (0)
Educational status			
Primary school	0 (0)	0 (0)	0 (0)
Secondary school	0 (0)	0 (0)	0 (0)
High school	14 (31,1)	25 (55,6)	6 (13,3)
University	0 (0)	0 (0)	0 (0)
Work experience			
1-5 years	7 (15,6)	16 (35,6)	3 (6,7)
>5 years	7 (15,6)	9 (20,0)	3 (6,7)
Previous BLS training			
Yes	0 (0)	0 (0)	0 (0)
No	14 (31,1)	25 (55,6)	6 (13,3)

BLS: Basic life support

years), as many as 23 respondents (51.1%) and a small percentage are in the age range of the elderly (46-55 years) as many as 2 respondents (4.4%). All respondents (100%) are high school graduates and male sex. More than half of the respondents (57.8%) had 1-5 years of work experience and all respondents (100%) had never attended BLS training before. Data on the characteristics of respondents can be seen in table 1.

The level of respondents' knowledge about BLS showed that as many as 14 respondents (31.1%) had good knowledge, 25 respondents (55.6%) had sufficient knowledge, and 6 respondents (13.3%) had insufficient knowledge. Data on the level of knowledge of respondents can be seen in table 2.

Based on the characteristics of the respondents, it was found that most of the respondent who had suitable and sufficient knowledge level was 26-35 years old. However, most of the respondent who had insufficient knowledge level was 36-45 years old. Based on work experience as a security, there was no difference in the number of respondents who had good knowledge in 1-5 years and > 5 years of work experience, as well as the number of respondents who had insufficient knowledge. However, respondents with sufficient knowledge had at most 1-5 years of experience. Complete data can be seen in table 3.

4. Discussion

This study shows that most of the respondents had sufficient knowledge level. Differences in characteristics of respondents only in the age range and work experience.

Most respondents were in the age range of 26-35 years, which is the stage of early adulthood.

They dominated the group of good and sufficient levels of knowledge. All respondents in this study had never received BLS training. This study can reflect that an individual can know about BLS without participating in training, which is through information media access.[8] The main sources of BLS information can come from schools, universities, or BLS training institutions both from the government and the private sector and also media such as television and the internet. The results of the study in Saudia Arabia, indicate that the most common sources of information about CPR are television and film. This is because the media can reach the broader population to raise awareness about BLS.[9] Research in Jakarta, Indonesia also shows that the people of Jakarta have a good level of knowledge about BLS with the most information sources from electronic media.[10]

However, the early adult individual has not experienced cognitive changes and is very able to accept or learn new things.[11] Young age can remember things better than old age. Individuals who are have experienced aging decreased physiological body which will affect the ability to remember information.[1, 12]

The result of this study is supported by another study that describes BLS Police knowledge in Depok City. The results of that study showed from 23 police early adulthood 20% had sufficient knowledge, 17% had insufficient knowledge, and 13% had bad knowledge.[1] However, this study differs from the research of Subki, et al., which describes knowledge in residents in Saudi Arabia. In this study, the age group <25 years had better knowledge about BLS than at the age of ≥ 25 years.[8] Also, Nugroho's research describes the BLS knowledge level of nurses in the ward. Nurses aged 26-35 years have the lowest level of knowledge.[13]

Other results showed that respondents in the group of 1-5 years of work experience who had sufficient knowledge were 26 people, and good knowledge were 7 people. While in the group of > 5 years of work experience, 9 people had sufficient knowledge and 7 people had good knowledge. The results of this study are not following the theory which explains that a longer experience will increase knowledge and professional skills and develop the ability to make a decision.[14] The same results show that in the age group 5-10 years no one has good knowledge, enough, less, only got 1 respondent who had inadequate knowledge.[1]

Another research shows that the impact of BLS training on the general public is very good for improving BLS knowledge, attitudes, and skills.[15] Other studies also show that BLS training provided by the general public can reduce mortality and morbidity.[8] The results of this study indicate the need to increase BLS training for security personnel to increase knowledge, attitudes, and skills in conducting BLS so that the morbidity and mortality rates for victims of traffic accidents and workplace accidents can decrease.

Security service providers can work together with hospitals or BLS training providers to provide BLS training to their employees so that security capabilities in the field of the rescue of traffic accident victims or work accidents can be increased. Besides, support from the nearest health service institution is also needed. Health service providers can empower security by providing BLS training, so security who already have a BLS certificate can help victims of traffic accidents and workplace accidents before medical personnel arrive at the scene. This can increase the role and motivation of security to participate in helping and saving victims.

The limitation of this study is that the number of samples is small and the area is limited to only Daendles Highway, so the results of the study cannot yet represent the entire population in the Regency of Gresik. Another limitation is the lack of variation in some of the characteristics of respondents, which is level of education, gender, and previous BLS training so that the results of the study do not represent the diversity of characteristics.

5. Conclusion

This study shows that most of the security along Daendles Highway had sufficient knowledge level about BLS. Providing BLS training program for

security by both medical personnel and companies related is needed for improving security knowledge and skill about BLS.

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Conflict of interest

There is no conflict of interest.

References

1. Hutapea EL. An overview of the level of knowledge of traffic police regarding basic life support (BLS) in Depok City [Skripsi]. Depok; Indonesia University. 2012.
2. Hardoko E. WHO: Every 24 seconds one person dies in a traffic accident [internet]. Jakarta: Kompas.com; 2018 [updated 2018 December 7; cited 2019 Juni 25]. Available from: https://internasiona.kompas.com/read/2018/12/07/13032721/who-tiap-24-detik-satu-orang-tewas-akibat-kecelakaan-lalu-lintas.
3. Miguel GF. Emergency care in the autonomous region of Spain. Improvement in pre-hospital emergency care and welfare coordination SESPAS Espana, Madrid. Journal of Emergency. 2012.
4. S Andi. 600 more traffic accidents occurred in Gresik during 2017 [internet]. Gresik: beritagresik.com; 2017 [updated 2017 December 27; cited 2019 Juni 25]. Available from: https://beritagresik.com/news/peristiwa/27/12/2017/600-lebih-kecelakaan-lalu-lintas-terjadi-di-Gresik-selama-2017.html.
5. Sugiyono. A month, 15-21 people died on the highway in the Gresik region, beware of the following vulnerable locations [internet]. Surabaya: surabaya.tribunnews.com; 2016[updated 2016 Juni 3; cited 2019 Juni 25]. Available from: https://surabaya.tribunnews.com/2016/06/03/sebulan-15-21-orang-tewas-di-jalan-raya-wilayah-Gresik-waspadai-lokasi-rawan-berikut-ini.
6. Annas DS. Relationship to basic life support (BLS) knowledge with readiness to help PMR member students at Purworejo State Islamic Senior High School [Skripsi]. Gombong; Sekolah Tinggi Ilmu Kesehatan Muhammadiyah. 2016.
7. Bariqi F. The effect of simulation-based basic life support training on the level of knowledge helped victims of traffic accidents in Yogyakarta City police [Skripsi]. Yogyakarta; Universitas Muhammadiyah Yogyakarta. 2017.
8. Subki AH, Mortada HH, Alsallum MS, Alattas AT, Almalki A, Hindi MM, et al. Basic life support knowledge among a nonmedical population In Jeddah, Saudi Arabia: a cross-sectional study. Interact J Med Res. 2018;7(2):1-9.
9. Jarrah S, Judeh M, AbuRuz ME. Evaluation of public awareness, knowledge and attitudes towards basic life support: a cross-sectional study. BMC Emergency Medicine. 2018; 18: 37.
10. Erawati S. Level of knowledge of the people of Jakarta about Basic Life Support (BLS) in the City Administration of South Jakarta [Skripsi]. Jakarta; Universitas Islam Negeri Syarif Hidayatullah. 2015.
11. Wardani NI, Sarwani D, Masfiah S. Factors related with level of health volunteers knowledge about *thalassaemia* in sumbang district banyumas regency. Jurnal Kesmasindo. 2014; 6: 194-206.
12. Yusra VD, Machmud R, Yenita. Factors related to the level of knowledge of fertile women about "SADARI" in Nagari Painan. Jurnal Kesehatan Andalas. 2016. 5 (3): 697-704.
13. Nugroho LF. An overview of the level of knowledge of nurses about basic life support (BLS) in the surgical ward in Wates Hospital [Skripsi]. Yogyakarta; STIKES Jenderal Achmad Yani. 2017.
14. Efendi F & Makhfudli. Community health nursing. Jakarta: Salemba Medika. 2013.

15. Wijaya WA. The effect of basic life support training on the level of knowledge, skills, attitudes towards basic life support at Gontor Kediri Islamic Boarding School. IR-Perpustakaan Universitas Airlangga.

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Empowering community health volunteer on community-based tuberculosis case management programs in lower-income countries: A systematic review

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ABSTRACT Globally, almost 40% of tuberculosis clients are undiagnosed and delayed treatment. This condition leads to disease transmission and increasing new cases. Healthcare workers and community health volunteers as an active case finding frontliner and case manager in the community. The elevated numbers of new case findings and comprehensive management of diseases are the successful indicators of the tuberculosis prevention program. This study identified research articles related to community health volunteer empowerment in tuberculosis case management. Literature study of 20 articles from journal database, such as: Science Direct, Proquest, Scopus, and EBSCO for the last 5 years. It used keywords tuberculosis, community volunteer or empowerment, community-based early case finding. Data were analyzed in tables consist of title, author, year, methodology, result, and recommendation. The empowerment of the community health volunteers was effective in increasing tuberculosis case finding, especially in the border areas, remote areas and rural area. The existence of the community health volunteers brought tuberculosis services closer to the community and able to minimize barriers of health access and costs. Increasing the capacity of the community health volunteers is needed to support their role. Community health volunteers with a history of tuberculosis or from a family with tuberculosis are more acceptable in the community so the success of case finding and treatment is achieved. Community health volunteers worked through home visits were able to change community's perspectives, promote the formation of health seeking behavior and minimize public-stigma. The empowerment of the community health volunteers is essentially needed as the alternative strategies to find new cases in the community and strengthen its management. There need to provide a wholesome moral and material support from the government for the community health volunteers. This can be integrated into the management of tuberculosis programs in primary health care facilities.

KEYWORDS community empowerment; health volunteers; tuberculosis case management

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1. Introduction

Tuberculosis (TB) is a global public health problem. Every person in the world is at risk of being infected with this disease so that it becomes a priority for health problems that need to be resolved. TB is the second highest cause of death in the world based on the Global Burden of Disease study in the Indonesian Ministry of Health.[1] TB patients reached 1/3 of the total population in the world and nearly 40% of TB clients are left undiagnosed and experienced treatment delays.[2] Globally, the number of new TB cases was 18%, of the cases that have been treated have multidrug-resistant TB (MDR-TB). It is estimated that 8.5% of TB patients diagnosed with MDR-TB have experienced extensive drug-resistant TB (XDR-TB).[3] TB becomes one of the diseases with a steadily increasing number of cases in Indonesia.[4] Moreover, Indonesia is one of the countries with the highest prevalence of tuberculosis in ASEAN and is ranked third after India and China. The report stated that Indonesia was included in the list of 30 high TB burden countries.[1] The number of TB cases in Indonesia was 420,994 cases in 2017, who are dominated by people of productive age.[4]

The Government of Indonesia had set targets in the National Mid-Term Development Plan (*Rencana Pembangunan Jangka Menengah Nasional* - RJPMN) contained in Presidential Regulation Number 59 of 2017 concerning SDGs, which is to set the target for the prevalence of TB in 2019 to 245 per 100,000 population. Minister of Health Regulation No. 67 of 2016 stated the target of national TB Management, namely TB Elimination in 2035, and TB-Free Indonesia in 2050. The National Target of Indonesia was the number of TB cases decrease to 1 per 1,000,000 residents.[4]

The Directly Observed Treatment Short-course (DOTS) strategy applied by the government as an effort to control TB by involving TB treatment observers (*Pengawas Minum Obat* - PMO) to monitor each dose consumed by TB clients as an effort to help successful TB treatment and obtain satisfactory results.[5] The government also established the Find, Treat, and Cure TB (*Temukan Obati Sampai Sembuh* –TOSS-TB) program to encourage clients to take medication regularly and completely as planned so that they can prevent the incidents of MDR and XDR-TB. In addition, the community also took part in another TB control program in Indonesia by establishing the Indonesian Tuberculosis Eradication Association (*Perkumpulan Pemberantasan Tuberkulosis Indonesia* - PPTI), which is a professional organization in partnership with the government focusing on TB control program. PPTI committees are spread in various regions in Indonesia with the activities including relay of TB-related information and also hold training for community health volunteers (CHV), specifically called cadres in Indonesia.[6]

Based on this phenomenon, the implementation of TB control programs requires special handling with the involvement of all parties, including the Government, Private Sector, and active community participation. Increasing active community participation, especially clients of TB, PMO, and TB health volunteers are highly recommended for increasing case findings and complete treatment to avoid the uprise incidents of MDR-TB and XDR-TB.

2. Methods

A literature review strategy in this research article was carried out comprehensively and systematically. There were 20 research articles from the databases of Science Direct, Proquest, Scopus, and EBSCO in the last five years. The inclusion criteria are: (1) articles are English, (2) published in indexed journals with a range of 2015-2019, (3) original research with various designs, (4) free-access full text, (5) the articles have aim to identify efforts to empower cadres in the TB management, (6) the keywords are used Tuberculosis, community volunteer or empowerment, community-based early case finding. Data were analyzed in a table consists of title, author, year, methodology, results, and recommendations. The critical appraisal used Critical Appraisal Skills Program (CASP). Figure 1 shows the process of research articles selection

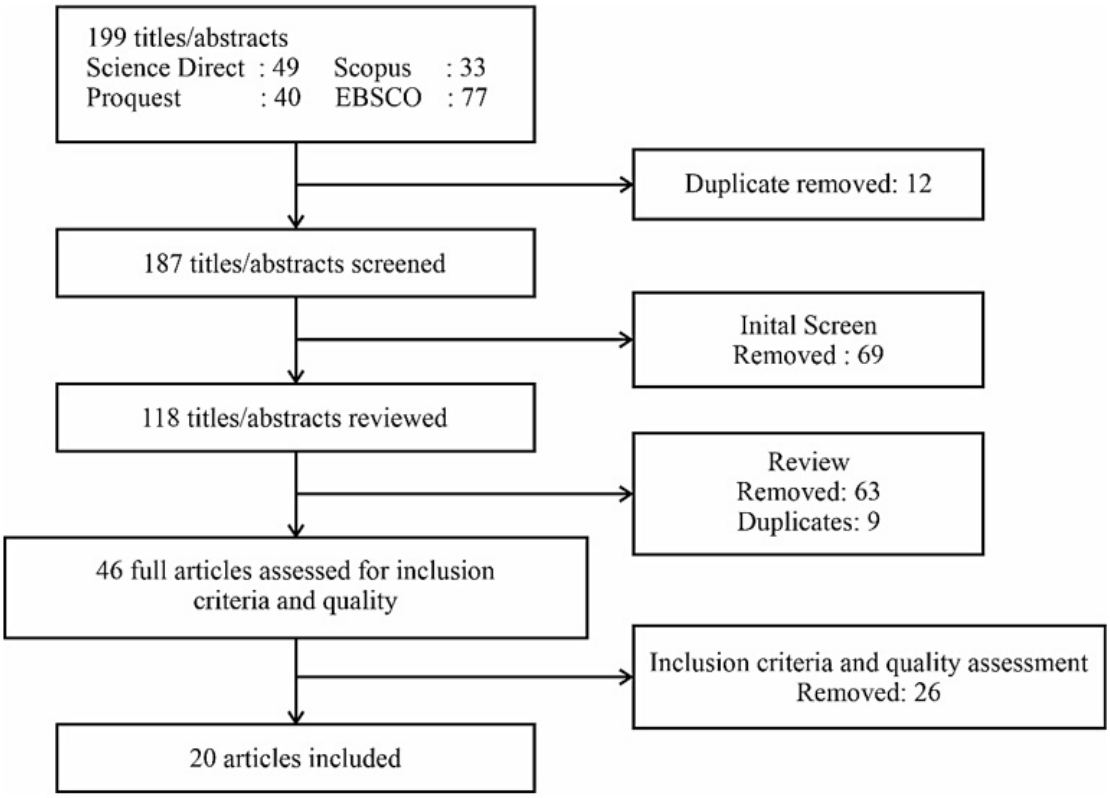

Figure 1. Article selection based on inclusion and exclusion criteria

based on inclusion criteria.

3. Results

Based on the articles that have been analyzed, the empowerment of CHV effectively increased the discovery of TB cases, especially in urban areas. CHV was able to bring TB services closer to the community, thereby reducing barriers to access and costs. CHV also play a role in exploring knowledge, behavior, and stigma related to TB patients, and early detection of cases in the community. Summary of articles that have been analyzed is presented in Table 1.

The results of the literature review showed the empowerment of CHV effective in the management of TB cases. This was proven by CHV who took part in structured training were able to mention the signs and symptoms of TB, identify suspected TB cases in the community, and also the CHV received a response from the sub-district health management team on surveillance reports.[8] In addition, CHV have high enthusiasm participating in the training, as shown by their attendance, which were held based on the national TB program guidelines. However, standardization of incentive for CHV is needed as well as the quality of supervision to ensure CHV performance as one of the main axis of the national TB program in the community.

4. Discussion

CHV are workers in health care who carry out their functions by providing health services, trained in the context of interventions, but do not have tertiary education. Meeting the demand for services, increasing use of health services, improving management in various conditions is a key role of CHV empowerment programs.[15] Based on the knowledge of TB CHV, the CHV empowerment program is able to identify TB knowledge that is lacking in patients, affecting TB management from clients. CHV play a role in raising awareness of TB clients in the community and promoting adherence

Table 1. Summary of articles related to empowering community health cadres in the management of TB cases in 2013-2018 (n = 20)

No	Authors	Year	Methods	Sample	Results
1	Amenuvegbe et al.[7]	2016	Cross sectional	932 patients and 105 CHV	A total of 932 patients reporting prolonged cough (2 weeks or more), 230 performed sputum examinations, 57 patients had smear (+) result, 52 patients treated. A total of 105 CHV attended structured training, were able to mention the signs and symptoms of TB, 28 out of 105 cadres had identified suspected TB cases in their community, only 10 CHV received a response from the sub-district health management team about surveillance reports. The majority of health care faciities empower cadres for monitoring but did not always provide feedback.
2	Mpagama et al.[8]	2019	Mix-method of quantitative and qualitative approach, retrospective cohort and cross sectional	399 patients	399 TB patients were recruited, 160 patients collected sputum, 120 sputum specimens, 16 patients diagnosed with MDR TB and needed a treatment. As many as 28 of the 55 sub-districts participated, 11 sub-districts had Rapid Molecular diagnostic laboratories and 64 laboratory offices. The use of molecular diagnostics needs to be improved through empowerment and training for health workers to reduce delay in diagnosis.
3	Soe et al.[9]	2017	Cross sectional	21.995 TB cases	As many as four NGOs reached out to the communities with the main target of migrant workers in border and conlicted areas. There are differences in terms of community health volunteers, there are NGOs that empower CHV in the health structure, there are those who organize and there are those who empower cadres around the client. NGOs succeeded in supporting community-based TB treatment activities in the detection of TB cases.
4	Han et al.[10]	2017	Descriptive study	4 NGOs	As many as 4 NGOs assist National TB Programmes in carrying out Community Based TB Care activities in remote areas. Every NGO had diverse problems and was able to respond with the right strategies. The total cost required was US $ 140 754 to US $ 550 221 during the study. The costs required per patient range from US $ 215 to US $ 1,076 for new cases and US $ 354 to US $ 1,015 for cases of repeat care based on the target area and package services offered.
5	Lorent et al.[11]	2015	A Mixed-Methods Study	117 participants	The majority of participants (91%; n = 87) preferred to be accompanied by CHV to accompany people who suffer from TB. Sputum collection at home was considered comfortable by 71 people (83%), but 16 people (17%) felt it was embarrassing. Strong involvement with community representatives is believed to be important in gaining access to communities at high risk of TB.
6	Dewi et al.[12]	2016	A Mixed-Methods Study	50 participants	A total of 50 participants in six villages were interviewed and three group discussions were conducted in intervention villages plus 1-5 hours of observation during monthly visits. Knowledge of TB increased after intervention in educational activities in the villages. Early case detection also increased in villages. Behavior changes related to TB prevention are also clearly seen in the villages that have been intervened.
7	James et al.[13]	2017	Retrospective study	737 cases	The Active Case Finding (ACF) model is based on a door-to-door program in poor urban areas. The program wass effective in finding TB cases in disease control programs. Empowerment of CHV is important for identifying patients' symptoms. In addition, cost-effectiveness comparisons were used to inform the allocation of resource decisions of national policy makers.
8	Wai et al.[14]	2018	Cohort study	456 participants	Patients who received family, health workers, and CHV' supports had 80% higher chance of starting treatment [aHR (0.95 CI): 1.8 (1,3, 2,3)] when compared to patients who did not receive support. In addition, age 15 ± 54 years, previous history.

Table 1. Continued

No	Authors	Year	Methods	Sample	Results
9	Okeyo and Dowse[15]	2016	Qualitative Study	14 participants	Three themes emerged from data analysis. First, altruism was identified as the main motivating factor, with the desire to help others. Second, Community care workers report great satisfaction and pride in their work. Third, most identified the need for further training and access to additional information about TB, specifically MDR- and XDR-TB, to strengthen knowledge and to educate patients about drug-resistant TB.
10	André et al.[16]	2018	Experimental Design	1713 CHV	CHV who play a role in screening families with tuberculosis are more acceptable to family members and able to access populations in rural areas. Screening has the potential to reduce TB-related morbidity and mortality and reduce transmission of disease in the community. The ability of cadres in screening to search for active TB cases is increasing with experience, and participating in supporting long-term projects. The higher the frequency of contact between cadres and the population, this intervention further increases awareness of tuberculosis and its symptoms.
11	Zhang et al.[17]	2016	Systematic literature review	17 articles	Involvement of CHV who play a role in screening families with tuberculosis are more acceptable to family members and able to access populations in rural areas. The ability of CHV in screening to search for active TB cases is increasing with experience, and participating in supporting long-term projects. The higher the frequency of contact between cadres and the population, this intervention further increases awareness of tuberculosis and its symptoms.
12	Vries and Pool.[18]	2017	Systematic Review	32 articles	The results of 32 studies cannot show concrete results, only one study was able to show the statistical size of Community and Lay Health Worker (CLHW) program integration in the community. Instead, the results of the study show a bigger problem, namely the absence of indicators that measure community relations with the CLHW program in the study. Studies only pay attention to gender and other roles, limited demographic information about the recruitment process. To improve results, the CLHW program must be directed at the public health system, ignoring needs in strategic cooperation and learning to share.
13	Adejumo et al.[19]	2015	Case Study	115 CHV	This study compared four models of increasing case finding in the community and found a relative contribution in overcoming the high burden of TB cases in Nigeria. Community-based TB care can be a core strategy in TB control in Nigeria because 75% of people with Positive Acid-Fast Bacillus TB have the potential to be identified in community members. Early detection of TB cases in communities in the country requires a case-based strategy and the contribution of CHV to significantly detect TB cases.
14	Datiko et al.[20]	2015	Qualitative Study	37 participants	TB REACH interventions were provided by all health workers in vulnerable groups, rural and remote community groups. CHV are intrinsic components in motivating roles. The importance of providing services close to the community to improve access to TB diagnosis and care services, especially in vulnerable groups, and poor populations in remote areas. It takes a program based on the development of support providers and maintaining motivation by CHV.
15	Choowong et al.[21]	2016	Qualitative Study	10 participants	Perception of leaders of Direct Observation Treatment (DOT) Program Management: Compliance with TB treatment program guidelines, Management DOT program follows the National TB Program guidelines, Health education training for CHV. Achieve full recovery, the need for support: Home visits and follow-up. TB patients and their families: Empowerment, care and health education. Community needs: participation, good cooperation among stakeholders (district leaders, village health volunteers, TB patients and their families, villagers). Need to improve motivation for district leaders. Health system: Having effective information material for village health volunteers (Cadre).

Table 1. Continued

No	Authors	Year	Methods	Sample	Results
16	Myet et al.[22]	2017	Penelitiandekriptif	84 TB patients	4 years monitoring of TB program program showed that the number of TB suspected cases has decreased, as well as the number of TB patients receiving treatment but not statistically significant (p = 0.051). There was an increase in TB case notifications compared to the number of TB clients who received treatment and referrals. The decrease in the number of TB clients receiving treatment is in the regions of Bago, Naypitaw, Mon, and Eastern Shan. Of the 84 districts that were targeted for research, the contribution of CBTC in changing TB detection cases decreased from 6% to 4% for 4 years.
17	Islam et al.[23]	2013	Cross-sectional retrospective study	9037 participants (TB patients)	CHV were assigned as well as village doctors to visit the house. TB training given by doctors, community health workers and CHV took place from 2005-2010 with a total of 536 trainings and attended by 9037 people. In addition, there were 4570 patients recovering from TB who had also been trained. There had been an increase in TB patient visits to laboratory diagnostic tests from 8211 patients in 2004 to 10961 in 2005, with positive smear patients increasing from 7.1% to 11.2%. Referral of patients to the laboratory is influenced by the role of cadres, with as many as 58% of participants expressing the initiative to visit a diagnostic testing laboratory.
18	Samal and Dehury[24]	2018	Cross-sectional	648 CHV	The selected cadres attended the TB management-related training for 2 days will later be assigned to prevent TB in the community. After training, CHV were expected to be able to carry out the tasks: creating public awareness, being able to recognize the signs and symptoms of TB and referring them to health services, to provide medical support. The training also includes basic material related to the TB program and Directly Observed Treatment Short Course strategy as well as the checklist format that is needed while carrying out its role as a cadre. CHV training wass significantly able to increase knowledge but not attitudes. Of the 10 trained CHV, 8 were assigned to various levels of activity in the community.A total of 5633 households were contacted by CHV to raise awareness about TB.
19	Barker et al.[25]	2002	Prospective cohort study	170 CHV	Patients who have been diagnosed and allowed to go home by the hospital will be referred to the community and accompanied by a CHV. CHV serving as PMO with the family supervised during the treatment regimen lasted 1476 TB patients identified 1358 with additional intrapulmonary diagnoses, and 82% positive Acid-Fast Bacillus, and 10 of them were MDR-TB.
20	Tuot et al.[26]	2019	Qualitative Study	56 participants	The active case finding model, seek-and-recruit,was generally well received by study participants. Researchers see the benefits of involving TB survivors and using their social networks to find new TB cases in the community. CHV also play an important role in the success of this model. The social attachment of the model in the local community is one of the main strengths. The success of the model also depends on integration with existing health facilities. Having a broad, motivated, and well-informed social network about TB is an important characteristic of successful seeds. Study participants reported challenges in motivating recruitment for screening, logistics capacity, and high workload during implementation.

TB: tuberculosis; CHV: community health volunteers; NGO: non-governmental organization; MDR-TB: multidrug-resistant TB; XDR-TB: experienced extensive drug-resistant TB; PMO: pengawas minum obat (drug taking supervisors)

among patients.[15]

The analysis above also shows that CHV have a role in increasing the discovery of new TB cases and management of their treatment. The majority of participants in a study by Lorent et al. (91%; n = 87) preferred to be accompanied by CHV to assist people who suffer from TB. Sputum collection at home was considered comfortable by 71 people (83%), but 16 people (17%) felt it was embarrassing.[11] Strong involvement with community representatives is believed to be the Model Active Case Finding (ACF) based on a door-to-door program in poor urban areas. The program is effective in finding TB cases in disease control programs.[13] Empowerment of CHV is important for identifying patient symptoms. In addition, cost-effectiveness comparisons are used to inform the allocation of resource decisions of national policy makers.

Several researches had shown that CHV were able to change trust and stigma within the community. The health CHV role as educators in the community can increase knowledge and attitudes towards TB. The increased knowledge among others regarding understanding causes, transmission, prevention, signs and symptoms, and awareness of free TB services. Increased knowledge will reduce diagnostic delays among people at risk.[27]

CHV are the intrinsic components in community motivating roles. The pivotal function of CHV included providing health services that are close to the community to improve access to TB diagnosis and care services, especially in vulnerable groups, and poor populations in remote areas.[20] TB management prgram in the community worked by carrying out a program based on the national development of supporting providers and maintaining motivation through the helps of the CHV. It increase coverage of TB treatment and find missed TB cases and play a role in providing input into TB policy design in populations.[8]

5. Conclusion

Community-based TB management is the main strategy of TB control program in various countries in the world. Empowerment of CHV is proven to be able to increase access to people who are at high risk of TB transmission. CHV collaborating with health workers are expected to play an active role in the discovery of new cases through home visits, raise public awareness, treatment support, conducting TB transmission preventive acitivities, and carrying out referral system to the clients in the community. The involvement of CHV is able to increase the number of new case discoveries, reduce the incidents of drug-resistant TB, reduce complications and even mortality from TB disease.

Recruitment of special TB CHV in each region becomes one of the implication of the benefitting roles and functions of CHV based on the reasearches, as needed. CHV who have treated TB clients or have a history of TB have a good approach to TB clients. There are also needs of providing full moral and material support from the government to CHV. The government, in this case is the health office through the health center, is obliged to perform training, mentoring, and provide operational costs for CHV in the management of TB control. This can be integrated in the management of TB programs in primary health care facilities.

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Conflict of interest

There is no conflict of interests.

References

1. World Health Organization (WHO). World Health Statistics 2015. 2015. www.who.int.
2. Tong H Van, Velavan TP, Thye T, Meyer CG. Human genetic factors in tuberculosis : an

update. 2017;22(9):1063–71.

3. Third WHO. World Health Organization . Invest to overcome Glob impact NTDs Rep neglected Trop Dis. 2015;(Gambar 1):1–12.
4. Kemenkes RI. Kesehatan dalam Kerangka Sustainable Development Goals (SDGs). Rakorpop Kementeri Kesehat RI [Internet]. 2015;(97):24. Available from: http://www.pusat2.litbang.depkes.go.id/pusat2_v1/wp-content/uploads/2015/12/SDGs-Ditjen-BGKIA.pdf
5. Emani S, Thomas R, Shah R, Mehta DS. Application of transtheoretical model to assess the compliance of chronic periodontitis patients to periodontal therapy. 2016;
6. Yakpermas-banyumas A. Journal Keperawatan Dan Kesehatan DALAM PERAWATAN TB PARU MELALUI PAKET PENDIDIKAN. 2016;(1):1–10.
7. Amenuvegbe GK, Francis A, Fred B. Low tuberculosis case detection : a community and health facility based study of contributory factors in the Nkwanta South district of Ghana. BMC Res Notes. 2016;9: 330.
8. Mpagama SG, Mbelele PM, Chongolo AM, Lekule IA, Lyimo JJ, Kibiki GS, et al. Gridlock from diagnosis to treatment of multidrug-resistant tuberculosis in Tanzania : low accessibility of molecular diagnostic services and lack of healthcare worker empowerment in 28 districts of 5 high burden TB regions with mixed methods evaluation. BMC Public Health. 2019;1–12.
9. Soe KT, Saw S, Griensven J Van, Zhou S, Win L, Chinnakali P, et al. International non-governmental organizations ' provision of community- based tuberculosis care for hard-to-reach populations in Myanmar , 2013 – 2014. Infectious Diseases of Poverty; 2017;1–8.
10. Han WW, Saw S, Isaakidis P, Khogali M, Reid A, Hoa N, et al. Different challenges , different approaches and related expenditures of community- based tuberculosis activities by international non-governmental organizations in Myanmar. Infectious Diseases of Poverty; 2017;1–9.
11. Lorent N, Choun K, Thai S, Kim T, Huy S, Pe R, et al. Community-Based Active Tuberculosis Case Finding in Poor Urban Settlements of Phnom Penh , Cambodia : A Feasible and Effective Strategy. 2014;9(3):1–12.
12. Dewi C, Barclay L, Passey M, Wilson S. Improving knowledge and behaviours related to the cause , transmission and prevention of Tuberculosis and early case detection : a descriptive study of community led Tuberculosis program in Flores , Indonesia. BMC Public Health. BMC Public Health; 2016;1–13.
13. James R, Khim K, Boudarene L, Yoong J, Phalla C, Saint S, et al. Tuberculosis active case finding in Cambodia : a pragmatic , cost-effectiveness comparison of three implementation models. BMC Infectious Diseases; 2017;1–8.
14. Wai PP, Shewade HD, Thu N, Kyaw T, Thein S, Si A, et al. Community-based MDR-TB care project improves treatment initiation in patients diagnosed with MDR-TB in Myanmar. PloS One. 2018;29:1-15.
15. Okeyo I, Dowse R. Community care worker perceptions of their roles in tuberculosis care and their information needs. Health SA Gesondheid. 2016;21:245-252.
16. André E, Rusumba O, Evans CA, Ngongo P, Sanduku P, Elvis M, et al. Patient-led active tuberculosis case-finding in the Democratic Republic of the Congo. Bull World Health Organ 2018;96(8):522–30.
17. Zhang H, Ehiri J, Yang H, Tang S, Li Y. Impact of community-based DOT on tuberculosis treatment outcomes : A Systematic Review and Meta-Analysis. PLoS One. 2016;11(2):1–20.
18. Vries DH De, Pool R. The influence of community health resources on effectiveness and sustainability of community and lay health worker programs in lower-income countries : A systematic review. PLoS One. 2017;12(1):1–29.
19. Adejumo AO, Azuogu B, Okorie O, Lawal OM, Onazi OJ, Gidado M, et al. Community referral for presumptive TB in Nigeria : A comparison

of four models of active case finding. BMC Public Health [Internet]. BMC Public Health; 2016;1–10.

20. Datiko DG, Yassin MA, Tulloch O, Asnake G, Tesema T, Jamal H, et al. Exploring providers ' perspectives of a community based TB approach in Southern Ethiopia : implication for community based approaches. BMC Health Services Research; 2015;1–9.
21. Choowong J, Tillgren P, Söderbäck M. Thai district Leaders ' perceptions of managing the direct observation treatment program in Trang Province , Thailand. BMC Public Health; 2016;1–10.
22. Myet H, Maung W, Saw S, Isaakidis P, Khogali M, Reid A, et al. The contribution of a non-governmental organisation's Community Based Tuberculosis Care Programme to case finding in Myanmar: trend over time. Infectious Diseases of Poverty; 2017;1–6.
23. Islam S, Harries AD, Malhotra S, Zaman K, Husain A. Training of community healthcare providers and TB case detection in Bangladesh. Int Health. 2013;(June):223–7.
24. Samal J, Dehury R. Assessing the Impact of a Structured Tuberculosis Training Activity on the Knowledge and Attitude of Community Volunteers. Journal of Clinical and Diagnostic Research. 2018;(October):13–7.
25. Barker RD, Millard FJC, Nthangeni ME. Unpaid Community Providers of Directly Observed Therapy (DOT) In Rural South Africa. South African Medical Journal. 2002; 92(4):291-4
26. Tuot S, Kuo A, Teo J, Cazabon D, Sok S, Ung M, et al. Acceptability of active case finding with a seed-and-recruit model to improve tuberculosis case detection and linkage to treatment in Cambodia : a qualitative study. PLoS One. 2019;(July):1-14.
27. Balogun M, Sekoni A, Meloni ST, Odukoya O, Onajole A. Trained Community Volunteers Improve Tuberculosis Knowledge and Attitudes Among Adults in a Periurban Community in Southwest Nigeria. Am J Trop Med Hyg. 2015;92(3):625–32.

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Association of religious coping use with psychological well-being of mother of mentally retarded children

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ABSTRACTS Low psychological well-being in mothers of children with mental retardation can affect maternal mental health and quality of life. Psychological well-being of mothers depend on maternal coping strategies to overcome the burden of childcare. The religious background of Indonesian society makes mothers tend to use religious coping in handling the burden of nurturing their children. Aim of this study to determine the association between religious coping use and psychological well-being of mothers of children with mental retardation. This is an analytic descriptive study with cross-sectional design. Subjects were mothers of children with mild to moderate level of mental retardation, students of SLB Negeri 1 Bantul. The psychological well-being and religious coping of mother is assessed by Indonesian version of the Psychological Well-being Scale and Religious Coping Scale. The significance level of the statistical test is expressed at $p < 0.05$. Results of this study showed there is a significant association between religious coping and psychological well-being of mothers of children with mental retardation (X^2: 17.897; C: 0.377; p: 0.000; RP: 5.65; 95% CI: 2.46-12.92). All dimensions of religious coping have a significant association with the psychological well-being of the mother (p: 0.000). The dimensions of achieving comfort and closeness to God have the highest closeness association with the psychological well-being among other dimensions of religious coping (X^2: 39.041; C: 0.515). The confounding variables in this study are mother's age, mother's education, family income, marital status, mother's employment status, family income, children's gender, children's level of mental retardation and children's class grade. Mother's education has also a significant association with the psychological well-being of the mother (p: 0.021). Religious coping and mother's education contribute 26.7% to the psychological well-being of mothers. This finding reveals that religious coping is important to improve the psychological well-being of mothers of children with mental retardation.

KEYWORDS mental retardation; mother; psychological well-being; religious coping

1. Introduction

Children with mental retardation need parental care in the long term.[1] The process of caring for children with mental retardation can cause many difficulties for the mother as the primary caregiver of the child.[2] This condition causes an increase in psychological burden, family problems, marital conflict, nurturing dissatisfaction and disruption maternal health.[3,4] Mothers who are stressed by high parenting experience adjustment failures and have an impact on the mother's psychological well-being.[5,6] A study in Pakistan found that 56.8% of mothers of children with mental retardation have a low level of psychological well-being.[7] Maternal parenting stress manifests in symptoms

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of depression, anxiety, and somatic higher than parents of normal children.[18] Low psychological well-being is a predictor of the low quality of life of children with mental retardation and risk factors for maternal depression.[9]

Mother coping strategies will influence the adjustment process. The use of adaptive coping strategies will accelerate the process of acceptance of disability of children, reduce stress and improve psychological well-being of mothers.[2,10] A mother who has a high level of psychological well-being is able to accept the conditions, always grateful for what is and having life satisfaction when given gifts children with mental retardation.[11,12] Several factors that can affect the psychological well-being of the mothers, namely: age, gender, socio-economic status, marital status, personality, social relations, level of education, social support, children gender, chidren's level of mental retardation and religiosity.[13,14]

Each individual has a bio-psycho-socio-religious-spiritual aspect, so psychiatric disorder must be managed holistically and eclectically.[19] Background religious and cultural beliefs of mothers determine maternal coping adjusting to negative situations.[15,16] When in a state of helplessness and hopelessness, mothers who have religious beliefs tend to use religious coping.[17] According to a study in Pakistan, religious coping is one of the coping strategies that is often used by mothers of children with mental retardation.[18] With the background of a religious Indonesian society, it is assumed that the religiosity factor plays a role in the use of coping strategies for mothers of children with mental retardation in Indonesia. So far, research related to the aspect of religiosity in the realm of psychiatry is still lacking. Similar studies on the association between the use of religious coping and the psychological well-being of mothers of children with mental retardation have never been done in Indonesia. Based on the background above, the authors are interested in researching the association between the use of religious coping and the psychological well-being of mothers of children with mental retardation at the SLB Negeri 1 Bantul.

2. Methods

This is an analytic descriptive research with cross-sectional design to determine the association between the use of religious coping with the psychological well-being of mothers of children with mental retardation. Whole sampling technique was used to collect subjects. The study was conducted at SLB Negeri 1 Bantul for 3 weeks in April 2019. Inclusion criteria included mothers who were the biological mother and caregivers of the children with a mild to moderate level of mental retardation aged 6-24 years old who study on SLB Negeri 1 Bantul. The participants were 108 mothers. All mothers who met the study criteria received an informed consent form before data was taken. If the mother was agreed in participating, a member of the research team met with the mother privately, answered questions, and collected the signed informed consent. After that, research team collect demographic data, independent variables (religious coping), dependent variables (psychological well-being), and confounding variables (mother's age, family income, marital status, mother's employment status, family income, children's gender, children's level of mental retardation and children's class grade) from all subjects who meet inclusion criteria.

Data was taken from subjects using some instruments included personal data questionnaires, the Indonesian version of Psychological Well Being Scale ($r = 0.314\text{-}0.745$; $\alpha = 0.933$), and the Indonesian version of Religious Coping Scale ($r = 0.235\text{-}0.761$; $\alpha = 0{,}948$). Data analysis technique was performed in univariate (descriptive), bivariate (Chi square test); multivariate (multiple logistic regression test) and significant if $p < 0.05$. This study has been approved by the ethics committee with reference numbers KE/FK/0434/EC/2019.

3. Results

Characteristics of participants this study can be seen in tables 1. Tables 2 shows characteristics of children with mental retardation on SLB Negeri 1 Bantul. Tables 3 and 4 show the distribution

Table 1. Characteristics of mothers of children with mental retardation (n=108)

Variable	Mean ± SD	f	%
Mother's age (years)	45.52 ± 7.85		
Mother's age category			
Adult		103	95.4
Elder		5	4.6
Mother education			
High		62	57.4
Low		46	42.6
Marriage status			
Married		96	88.9
Widowed		12	11.1
Employment status			
Employed		65	60.2
Unemployed		43	39.8
Family income			
Low (< UMP)		62	57.4
High (> UMP)		46	42.6
Religion			
Islam		100	92.6
Catholic		4	3.7
Christian Protestant		4	3.7

Table 2. Characteristics of children with mental retardation (n=108)

Variable	Mean ± SD	f	%
Age (years)	14.12 ± 3.98		
Initial age study (years)	7.89 ± 2.81		
Initial age diagnosed with mental retardation (years)	4.77 ± 3.39		
Gender			
Boy		75	69.4
Girl		33	30.6
Level of mental retardation			
Mild (class C)		54	50.0
Moderate (class C1)		54	50.0
Class level			
Primary school		58	53.7
Junior high school		30	27.8
Senior high school		20	18.5

frequency of religious coping and psychological well-being of mothers of children with mental retardation in SLB Negeri 1 Bantul.

The Chi square test results in table 5 shows a significant association between religious coping and the psychological well-being of mothers of children with mental retardation (X^2: 17.897; p: 0.000; 95% CI: 2.46 -12.92; RP: 5.65; C: 0.377). There is also a significant association between the five dimensions of religious coping with psychological well-being of mother of children with mental retardation in SLB Negeri 1 Bantul (p: 0.000), namely: dimensions of finding a meaning (X^2: 13.412; p: 0.000; RP: 4.4; CI 95%: 1.95-9.82), dimensions of gain control (X^2: 19.871; p: 0.000; RP: 6.33; 95% CI: 2.73-14.69), dimensions of gain comfort and closeness to God (X^2: 39.041; p: 0.000; RP: 17.6; 95% CI: 6.53-47.45), dimension of gain intimacy with others and closeness to God (X^2: 14.656; p: 0.000; RP: 4.94; 95% CI: 2.12-11.49), and dimensions of achieving life transformation (X^2: 14.948; p: 0.000; RP: 4.8; 95% CI: 2.12-10.86).

Only one confounding variable i.e maternal education has a significant association with psychological well-being of mothers (X^2: 6.866; C: 0.244; p: 0.009; RP: 2.86; 95% CI: 1.29-6.35). The bivariate analysis showed no statistically significant association (p > 0.05) between others confounding variables include mother's age, family income, marital status, mother's employment status, family income, children's gender, children's level of mental retardation and children's class grade with the psychological well-being of mothers of children with mental retardation (table 6).

The results of the logistic regression test on table 7 shows there are two variables that influence and have a significant association with psychological well-being of mothers of children with mental retardation, namely religious coping (p: 0.000; RP: 4.612; 95% CI: 1.960-10.852) and mother's education (p: 0.043; RP: 1.449; 95% CI: 1.011-2.078). Fit model as measured by Nagelkerke R Square shows the value of R^2 = 0.267. This means that religious coping and mother's education have 26.7% effective contribution to the psychological well-being of mothers of children with mental retardation. The rest is explained by other variables that are not analyzed or examined.

Table 3. The distribution frequency of the total religious coping & dimensions of religious coping for mothers of children with mental retardation (n=108)

Variable	Mean ± SD	f	%
Religious coping	149.27 ± 15.37		
High		53	49.1
Low		55	50.9
Dimension of finding a meaning	20.60 ± 2.51		
High		54	50.0
Low		54	50.0
Dimension of gain control	37.26 ± 4.71		
High		56	51.9
Low		52	48.1
Dimension of gain comfort and closeness to God	35.35 ± 3.77		
High		59	54.6
Low		49	45.4
Dimension of intimacy with others and closeness to God	25.11 ± 2.88		
High		41	38.0
Low		67	62.0
Dimension of achieving life transformation	30.94 ± 3.96		
High		55	50.9
Low		53	49.1

Table 4. The distribution frequency of psychological well-being of mothers (n=108)

Variable	Mean ± SD	f	%
Total psychological well-being	77.48 ± 9.98		
High		51	47.2
Low		57	52.8
Self acceptance	18.08 ± 3.01		
High		47	43.5
Low		61	56.5
Positive relationships with others	14.69 ± 2.26		
High		52	48.1
Low		56	51.9
Autonomy	12.27 ± 1.99		
High		44	40.7
Low		64	59.3
Environmental mastery	12.63 ± 2.24		
High		54	50.0
Low		54	50.0
Purpose in life	12.31± 1.99		
High		44	40.7
Low		64	59.3
Personal growth	7.49 ± 1.66		
High		56	51.9
Low		52	48.1

4. Discussion

Most respondents (50.9%) have low religious coping where in the details of the dimensions of religious coping the majority of respondents had low scores on the dimension of gain intimacy with others and closeness to God (62%). This means that most mothers still lack the intimacy with others with regard to support from religious members. However, all of respondents did not state that they received negative religious comments which blamed them for their condition. Some respondents stated that they had received support from religious communities, such as strengthening by religious leaders through special religious services for children with disabilities (Catholic) or tausyiah (Islam) regarding the condition of the child. Spirituality and religiosity are useful in mediating stress and supporting mothers of children with disabilities.[20]

In table 3 shows 50% of respondents get balanced scores on dimensions of finding a meaning. This means that 50% of respondents can find the meaning and purpose of having children with mental retardation by the help of the values of religiosity beliefs, so they are able to accept the condition of the child. Every individual keeps trying to find the meaning of life, including mothers of children with mental retardation. The meaning associated with a situation is more influential than the situation itself. Mothers try to find support by switching to God and religion when facing situations that are unbearable, traumatic or fail to find solutions to problems. This is done as an effort to understand life and what has been passed so far.[21]

Some respondents stated that the religious teachings they believed were the main basis for them to be able to understand the meaning of

Table 5. Association between the dimensions of religious coping and the psychological well-being of mother of children with mental retardation

Variable	Psychological well-being								
	Low		High		X^2	C	p	RP	CI 95%
	f	%	f	%					
Religious coping									
Low	40	72.7	15	27.3	17.897	0.377	0.000	5.65	2.47-
High	17	32.1	36	67.9					12.92
Dimension of finding a meaning									
Low	38	70.4	16	29.6	13.412	0.332	0.000	4.4	1.95-
High	19	35.2	35	64.8					9.82
Dimension of gain control									
Low	39	75.0	13	25.0	19.871	0.394	0.000	6.33	2.73-
High	18	32.1	38	67.9					14.69
Dimension of gain comfort and closeness to God									
Low	42	85.7	7	14.3	39.041	0.515	0.000	17.6	6.53-
High	15	25.4	44	74.6					47.45
Dimension of gain intimacy with others and closeness to God									
Low	45	67.2	22	32.8	14.656	0.346	0.000	4.94	2.12-
High	12	29.3	29	70.7					11.49
Dimension of achieving life transformation									
Low	38	71.7	15	28.3	14.948	0.349	0.000	4.80	2.12-
High	19	34.5	36	65.5					10.86

Analysis was performed using chi-square test. Significant ($p < 0.05$).

having children with mental retardation and this could calm them down. Religiosity is the basis of a general perspective and system of meaning to understand the daily experiences of life for most individuals.[16] Religion seems to offer meaning to the misery and suffering of parents. With the religious perspective they have, the individual thinks that the world seems safe, fair, logical, harmonious, and finally can be controlled. Parents get hope, strength, and patience from the perspective of that religion. Respondents of this study stated the meaning of having children with mental retardation, namely: as blessed mothers, chosen by God, special mothers, children make mother's fortune increase, and children as tickets to heaven for them.

Most respondents received high scores on three dimensions of religious coping, namely: gain control (51.9%), gain comfort and closeness to God (54.6%), and achieving life transformation (50.9%). This means that respondents have high environmental control abilities, feel comfort and closeness to God, and get a life transformation. Religiosity (religion) as a coping strategy for mothers can function to offer strength, empowerment and control in dealing with problems, so that mothers are able to gain the insight, protection, and assistance needed to achieve the results they feel unable to reach with their own strength. Religiosity can also help individuals reduce emotional burdens, thereby arousing emotional comfort through personal association s with God. In addition, religiosity helps mothers surpass themselves and achieve self-growth.[22]

In table 4 shows 52.8% respondents in this study have a low total psychological well-being. Previous research also found that most mothers of children with mental retardation have low psychological well-being compared to mothers of normal children.[5,23] Low psychological well-being will affect the child care process, which will result

Table 6. Association of confounding variables with the psychological well-being of mothers of children with mental retardation

Variable	Psychological well-being								
	Low		High		X^2	C	p	RP	CI 95%
	f	%	f	%					
Mother's age (f)									
Adult	55	53.4	48	46.6	0.343	0.056	0.665	1.72	0.27-10.2
Elderly	2	40.0	3	60.0					
Children gender (c)									
Boy	39	52.0	36	48.0	0.060	0.023	0.807	0.90	0.39-2.05
Girl	18	54.5	15	45.5					
Mental retardation level (c)									
Mild	28	51.9	26	48.1	0.037	0.019	0.847	0.93	0.44-1.97
Moderate	29	53.7	25	46.3					
Children class grade (c)									
Low	48	54.5	40	45.5	0.596	0.074	0.440	1.47	0.55-3.89
High	9	45.0	11	55.0					
Mother’s education level (c)									
Low	31	67.4	15	32.6	6.866	0.244	0.009	2.86	1.29-6.35
High	26	41.9	36	58.1					
Marriage status (c)									
Married	51	53.1	45	46.9	0.042	0.020	0.838	1.13	0.34-3.76
Widow	6	50.0	6	50.0					
Mother’s employment status (c)									
Employed	33	50.8	32	49.2	0.264	0.049	0.607	0.82	0.37-1.77
Unemployed	24	55.8	19	44.2					
Family income level (c)									
Low	37	59.7	25	40.3	2.780	0.158	0.095	1.92	0.88-4.17
High	20	43.5	26	56.5					

Significant ($p < 0.05$); (c) Chi-Square; (f) Fisher exact test

in mothers feeling that caregiving is the thing must be done, feeling devastated in the present and life covered by the demands of nurturing.[8]

The results of the analysis prove that there is a significant association between religious coping and psychological well-being. These results are in accordance with other studies that also found a positive association between religiosity and psychological well-being.[24] From the results of the Chi square test there was also a significant association between all dimensions of religious coping with psychological well-being of mothers of children with mental retardation in SLB Negeri 1 Bantul (table 5). The dimensions of religion and spirituality have a positive correlation with psychological well-being associated with self-actualization, meaning of life, and personal growth initiatives.[25]

The dimensions of attaining comfort and closeness to God have the highest closeness

Table 7. The results of variable logistic regression tests related to the psychological well-being of mothers of children with mental retardation

	Variabel	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I for EXP(B)	
								Lower	Upper
Step 1[a]	Religious coping	1.529	0.437	12.263	1	0.000	4.612	1.960	10.852
	Mother's education level	0.371	0.184	4.076	1	0.043	1.449	1.011	2.078
	Income	0.158	0.469	0.114	1	0.736	1.171	0.467	2.937
Step 2[a]	Religious coping	1.528	0.436	12.261	1	0.000	4.609	1.960	10.840
	Mother's education level	0.394	0.171	5.288	1	0.021	1.482	1.060	2.073

Significant ($p < 0.05$)

association among other dimensions of religious coping (X^2: 39.041; C: 0.515). This means that the dimension of religious coping which primarily helps reduce the emotional burden of mothers of children with mental retardation is to bring personal relationships closer to God. Religion can be a protective factor to counter the burden of parenting with mental retardation.

The results of the analysis of most confounding variables showed no significant association with the psychological well-being of mothers of children with mental retardation (p > 0.05), except mother's education (table 6). Chi square test showed a significant association between maternal education and psychological well-being (p: 0.009; RP: 2.86; 95% CI: 1.29-6.35). Multivariate analysis (table 7) also shows that education has effect to the psychological well-being of the mother (p: 0.043; RP: 1.449; 95% CI: 1.011-2.078). Parents with higher education level report fewer child behavior problems, less burdened with higher parenting tasks and higher psychological well-being level than parents with low levels of education.[26] Higher education can provide individual resilience in the face of stress, challenges and life difficulties.[27]

5. Conclusion

This study shows that religious coping is important to improve the psychological well-being of mothers of children with mental retardation. It is necessary to conduct collaboration between the Department of Psychiatry FK-KMK UGM with the SLB Negeri 1 Bantul to conduct counseling and psychoeducation for mothers who have low religious coping and psychological well-being. Psychoeducation is given by increasing intimacy with others and getting closer to personal relationships with God. Disdikpora DIY also should make promotional efforts to improve maternal psychological well-being. Other research is still needed to explore another issue on pychological well being of mothers of children with mental retardation.

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Conflict of interest

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References

1. Mohan R, Kulkarni M. Resilience in Parents of Children with Intellectual Disabilities. Psychology and Developing Societies. 2018; 30(1): 19-43.
2. Cauda-laufer, N. 2017. Raising a Child with a Disability: Coping Mechanisms and Support Needs. PCOM Psychology Dissertations. 2017;

432.

3. McConnell D, Savage A. Stress and Resilience Among Families Caring for Children with Intellectual Disability: Expanding the Research Agenda. Current Developmental Disorders Reports. 2012; 2(2): 100–109.
4. Chouhan CS, Singh P, Kumar S. Assessment of Daily Parenting Stress and Depressive Symptoms among Parents of Children with Intellectual Disability. International Multispecialty Journal of Health. 2016; 2(4): 2395–6291.
5. Vargas-Muñoz ME, López-Liria R, Rocamora-Pérez P, Aguilar-Parra JM, Díaz-López MP, Padilla-Góngora D. Maladjustment in Families with Disabled Children. Procedia-Social and Behavioral Sciences. 2017; 237: 863-868.
6. Parameswari S, Gnanajane EJOJ. A Study on Psychological Well Being among the Parents of Children with Intellectual and Developmental Disabilities. IOSR Journal of Humanities and Social Science. 2016; 8-12
7. Kishore MT. 2011. Disability Impact and Coping in Mothers of Children with Intellectual Disabilities and Multiple Disabilities. Journal of Intellectual Disabilities. 2011; 15(4), 241–251.
8. Simpson N, Mizen L, Cooper SA. Intellectual disabilities. Medicine. 2016; 44 (11): 679–682.
9. Wood A.M., & Joseph S. The Absence of Positive Psychological (Eudemonic) Well-Being as A Risk Factor for Depression: A Ten Year Cohort Study. Journal Affective Disorder. 2010; 122: 213-7.
10. Beighton C, Wills J. Are Parents Identifying Positive Aspects to Parenting Their Child with An Intellectual Disability or Are They Just Coping? A Qualitative Exploration. Journal of Intellectual Disabilities. 2017; 21(4), 325–345.
11. Singh, KT, Panday P. Burden, Stress and Coping Strategies of Intellectually Disabled Children. The International Journal of Indian Psychology. 2015; 2(3): 2348-5396.
12. Faramarzi S. Comparing The Quality of Life and Psychological Well-Being in Mothers of Children With Hearing Loss and Mothers of Children with Other Special Needs. Aud Vest Res. 2017; 26 (2): 86-92.
13. Ajmal S, Javed S, Javed H. Association Study between Level of Psychological Well-Being and Social Support among Depressed and Non-Depressed Women. International Journal of Humanities and Social Science. 2016; 6 (5), 161-164.
14. Batubara A. Hubungan Antara Religiusitas Dengan Psychological Well Being Ditinjau Dari Big Five Personality Pada Siswa SMA Negeri 6 Binjai. Jurnal Al-Irsyad. 2017; 7(1): 31-41.
15. Mirsaleh YR, Rezai H, Khabaz M, Ardekani IA, Abdi K. Personality Dimensions, Religious Tendencies and Coping Strategies as Predictors of General Health in Iranian Mothers of Children with Intellectual Disability: A Comparison with Mothers of Typically Developing Children. Journal of Applied Research in Intellectual Disabilities. 2011; 24: 573–582.
16. Sharak FM, Bonab BG, Jahed M. 2017. Association Between Stress and Religious Coping and Mental Health in Mothers with Normal and Intellectually Disabled Children. International Journal of Educational & Psychological Research. 2017: 3: 198-204.
17. Krok D. The Role of Meaning in Life Within the Relations of Religious Coping and Psychological Well-Being. Journal of Religion and Health. 2015; 54: 2292–2308.
18. Sheikh MH, Ashraf S, Imran N, Hussain S, Azeem MW. Psychiatric Morbidity, Perceived Stress and Ways of Coping Among Parents of Children with Intellectual Disability in Lahore, Pakistan. Cureus. 2018; 10(2): e2200.
19. Soewadi S. Simtomatologi Dalam Psikiatri. Yogyakarta: Medika Fakultas Kedokteran Universitas Gadjah Mada. 1999
20. Pillay D, Girdler S, Collins M, Leonard H. It's not What You were Expecting, But It's Still a Beautiful Journey": The Experience of Mothers of Children with Down Syndrome. Disability & Rehabilitation. 2012; 34(18): 1501–1510.
21. Hatun O, Yavuz-birben F, İnce Z, Gülay KY. The Ticket to Heaven: A Spiritual Resource for Coping with Disability. Spiritual Psychology and Counseling. 2016; 1: 209–235.

22. Pargament K, Feuille M, Burdzy D. 2011. The Brief RCOPE: Current Psychometric Status of a Short Measure of Religious Coping. Religions. 2011; 2: 51-76
23. Boromand N, Narimani M, Mosazadeh T. Comparing The Psychological Well Being Factor among The Parents of The Mentally Retarded Children With Those of The Normal Children. International Letters of Social and Humanistic Sciences. 2014; 21: 1-8.
24. Ismail Z, Desmukh S. Religiosity and Psychological Well-Being. International Journal of Business and Social Science: 2012; 3 (11): 20-28.
25. Ivtzan I, Chan CPL, Gardner HE, Prashar K. Linking Religion and Spirituality with Psychological Well-being: Examining Self-actualisation, Meaning in Life, and Personal Growth Initiative. Journal of Religion & Health [Internet]. Springer Nature. 2011; 52(3): 915-929.
26. Cramm JM, Nieboer AP. Psychological Well-being of Caregivers of Children with Intellectual Disabilities: Using Parental Stress as A Mediating Factor. Journal of Intellectual Disabilities. 2011; 15(2): 101–113.
27. Ryff CD. Psychological Well-Being Revisited: Advances in the Science and Practice of Eudaimonia. Psychotherapy and Psychosomatics. 2014; 83: 10–28.

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The economic impacts of wheelchair use: Evidence from Central Java, Indonesia

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ABSTRACT An estimated 10% of the global population has disabilities, and 1 out of 10 require wheelchairs. Although imperative, the provision of wheelchair services remains challenging, especially in low resource settings. Interacting barriers in availability of wheelchair services and healthcare access can negatively affect households of people with disabilities in productivity and obtaining income. The availability of wheelchair services can potentially lessen the related economic burden. However, to date there is limited evidence concerning the economic gain of the wheelchair users in Indonesia. This study aims to analyze the economic impact of using wheelchairs on households in rural Central Java Province, Indonesia. Economic gains of wheelchair users were measured using a cross-sectional survey in Central Java, Indonesia during 2017. The questionnaires consisted of three main sections, namely general information, socio-economic information before and after using adaptive wheelchair, and income and spending related information. A total of 60 adaptive wheelchair users and parent proxy completed the questionnaires. More than half (55%) of the respondents were male, became impaired in 1998, and used an adaptive wheelchair starting in 2009. Medical conditions of the respondents related to need for a wheelchair are cerebral palsy (29%), paraplegia (29%), and polio (15.5%). Three-fourths of the respondents were working in the informal sector. On average, there is a significant increase of Rp. 217,662 in monthly household income between before and after using a wheelchair. However, there was no significant difference in spending before and after using a wheelchair. Respondents feel that using a wheelchair is beneficial particularly in mobility and helping in their activities. Wheelchair use can increase the income of households with disability. Clients responded that there have been several aspects which need further support, including skills improvement, employment generation for people with disabilities, and adequate public transportation facilities.

KEYWORDS disability; economic impact; household income; Indonesia; wheelchair

1. Introduction

The World Health Organization (WHO) estimated around 10% of the global population has disabilities and 10% of this disabled population requires wheelchairs.[1] In 2012, The National Socioeconomics Survey (*SUSENAS*) found 2.45% of the Indonesia population has a disability in various aspects, while in Yogyakarta province, 3.89% of the population has some disability.[2] The Convention on

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the Rights of Persons with Disabilities emphasizes the commitment of signatory countries to ensure personal mobility for persons with disabilities and enable their independence.[3] Providing mobility aids, such as wheelchairs, would fulfill the commitment as well as support people with disabilities to engage in their daily activities and social activities.[1,4,5]

However, the provision of appropriate wheelchair and adequate wheelchair services remains challenging, especially in low resource setting.[1,6,7] The WHO has established The Guideline on the Provision of Manual Wheelchairs in Less Resourced Settings to increase appropriate wheelchair provision and services which is known as the 8-Step approach.[1,8,9] Wheelchair provision is defined as the supply of wheelchair intervention to a disabled person by any private, state or Not for Profit Organization (NFPO) which provides services supplying wheelchairs based upon assessment of mobility needs by a professional.[10]

Wheelchair services are provisioned according to the needs and related medical condition of the wheelchair user. A study in West Bengal, India in 2005 showed a lack of appropriate wheelchair provision causing wheelchair abandonment by the recipients due to pain, fatigue, discomfort and lack of habitat ability.[4,11] Evidently, the provision of wheelchairs according to the WHO 8-Step in Indonesia improved satisfaction with mobility significantly for children with proxies and adults with proxies.[8]

Although studies on impact of wheelchair provision on quality of life and satisfaction on wheelchair use have been conducted in Indonesia,[8] to our knowledge, studies on the economic benefits of wheelchair in Indonesia have not been conducted. This study aimed to investigate the economic benefits of providing wheelchair services for people with disabilities in Central Java. In particular, this study examined changes in productivity of wheelchair users and careers of people with disabilities in terms of income, household expenses, and the number of days absent from work. The results of this study will be beneficial to inform stakeholders whether wheelchair use can impact on households' economy.

2. Methods

A cross-sectional survey on economic impact was conducted among wheelchair users who attended a wheelchair service provision organized by UCPRUK (United Cerebral Palsy – Roda Untuk Kemanusiaan) and the Bureau of Social Services in the peri-urban near Yogyakarta, which included Magelang and Klaten between October-November 2017. Samples were purposively selected, and questionnaires were administered to adaptive wheelchair users or parent proxy who attended the event. To avoid mistakes and misunderstanding in filling the questionnaires, trained enumerators were present to assist respondents in administering the informed consent forms and answering questions related to the questionnaires. Respectively, 22 and 38 respondents in Magelang and Klaten participated in the survey. Participants were wheelchair users within the Social Service and UCPRUK network. Inclusion criteria were age more than 17 years old or parent proxy and adaptive wheelchair users for at least 6 months to capture their experience in using the wheelchair. Parent proxies answered the questionnaires for wheelchair users aged less than 17 years old. Exclusion criteria were people on temporary wheelchair.

The questionnaire on economic gain related to the use of adaptive wheelchairs consists of four parts; namely general information about patients, including gender, age, ethnicity, education, insurance status, and the type of adaptive wheelchairs used by patients; socio-economic information before and after using adaptive wheelchairs, including work, breadwinner in the family, the presence of assistants in engaging in daily activities, and caregivers; information regarding income and expenditure, including whether the use of adaptive wheelchairs affects household income and expenditure, food, use of health services, wheelchair repairs, and transportation; and qualitative questions whether adaptive wheelchairs affect income and expenditure in households. The data collected during the survey was entered by

enumerator, operator, and member checks were performed for data validation. Any abnormalities were checked against the original documents. Data were analyzed using software Stata 13.0. Due to the presence of extreme values in the expenditure data, results were reported using means. The T-test was used to assess differences between the means or medians for household expenditure and income between before and after using adaptive wheelchair.

3. Results

3.1 Respondents' characteristics

A total of 60 adaptive wheelchair users and parent proxies from Klaten and Magelang completed the questionnaires. Adaptive wheelchair users of interest are those who use either children's wheelchair, rough rider, active, supportive, reclining, or standard adaptive wheelchair. The majority of respondents were standard and children adaptive wheelchair users, with a percentage of 43% and 39%, respectively (Table 1). Not all respondents completed the survey questions. Reasons to leave blank some of the questions were due to difficulties to recall in answering some of the questions and choosing to not answering rather than giving answers that might be inaccurate. Around 88-100% of respondents answered each of the question.

Demographic characteristics of the wheelchair users include ages between 9 and 73 years with a mean of 31 years old (Table 1). More than half (55%) respondents were male, became impaired in 1998, and used an adaptive wheelchair starting year 2009. Medical conditions of the respondents related to need for a wheelchair are mainly cerebral palsy (29%), paraplegia (29%), and polio (15.5%). On average, wheelchairs users who participated in this study live in a household with four other family members. Among the respondents 53% and 47% were wheelchair users and parent proxy, respectively. Around 90% of respondents are covered by some health insurance and 80% are covered by the National Health Insurance or *Jaminan Kesehatan Nasional* (JKN). Education level for the majority of respondents was high school graduates (48%), elementary school (25%), and bachelor's degree (5%), whereas the rest (22%) have no formal education. Three-fourths of the respondents were working as entrepreneurs (informal sector), whereas a small proportion work as private employees (8%), and the remaining are housewives, civil servants, retired, pastors, or unemployed.

3.2 Economic gain of wheelchair users

Household income was asked from the respondents according to how much the household earns in one month. Fifty-five out of sixty patients completed the questions on economic gain of wheelchair users. Table 2 shows that on average there was a significant increase of Rp. 217,662 in household income before and after using a wheelchair (*p*-value

Table 1. Wheelchair users' characteristics

Characteristics	n	Mean	SD	Min	Max
Wheelchair user age (years)	60	31.4	17.4	9	73
Number of family member	60	4.1	1.5	1	8
Onset of disability (years)	56	1998	10.2	1972	2011
Year of receiving wheelchair	57	2009	8.1	1973	2017
Duration time between onset of disability and year of receiving wheelchair (years)	53	10.5	9.8	0	36
Time period using adaptive wheelchair (years)	57	7.9	8.1	0	44

SD: standard deviation; min: minimum; max: maximum; n: number of participants answered the questions.

Table 2. Household income wheelchair users

Income	Before using adaptive wheelchair			After using adaptive wheelchair			
	n	Mean	CI	n	mean	CI	*p*-value
Total household income (Rupiah)	55	914,509	762,237 - 1,066,781	55	1,132,171	942,139 - 1,322,202	0.001**
Total per capita income (Rupiah)	55	254,827	201,592 - 308,062	55	311,037	248,373 - 373,701	0.0018***

*significant at $p < 0.005$; ***significant at $p < 0.001$; CI: confidence interval; n: number of respondent

Table 3. Household expenditure

Spending	Before using adaptive wheelchair			After using adaptive wheelchair			
	n	Mean	CI	n	Mean	CI	*p*-value
Household (Rupiah)	58	1,025,528	845,655 - 1,205,400	58	1,067,745	871,285 - 1,264,204	0.205

CI: confidence interval

Table 4. Days absent from work

Before using adaptive wheelchair (day)			After using adaptive wheelchair (day)			*p*-value
n	Mean	CI	n	Mean	CI	
11	6.8	-1.1 - 14.7	11	1.5	-0,4 - 3.3	0.0875

CI: confidence interval

= 0.001). Per capita income before and after using adaptive wheelchair showed a significant increase of Rp 56,209 (*p*-value = 0.002). While, there was showed no significant differences on household expenditure before and after using adaptive wheelchair.

Table 3 shows that *p-value* was 0.205 ($p < 0.05$). The *p-value,* obtained by performing *T-test*, implied that there was no significant difference in household expenditure between 6 months before using an adaptive wheelchair and 6 months after using an adaptive wheelchair. Interviews were done in October 2017, while most of respondents have used a wheelchair since 2009.

Respondents were asked about days of absence from work in a month. As shown in Table 4, only 11 of 60 respondents responded since nearly 50% of them work independently in informal sector. People who work independently are generally challenged to count their working and absent days from work therefore they could not answer this particular question. Of the samples who responded to the question, *p*-value of 0.087 was obtained, which means that there was no significant difference in days of absence from work between 6 months before using an adaptive wheelchair and 6 months afterward. However, the result may not be representative due to the small number of samples.

3.3 Qualitative questions' result

The study participants had a variety of responses whether an adaptive wheelchair affects income of the households. Some respondents feel that wheelchair use impacted positively on the household income.

"*I cannot do my activities if there is no wheelchair*." *(Standard wheelchair user, 40 years)*

Study participants who were wheelchair users felt that it would be difficult to perform their activities without using a wheelchair. Also, those who took the role as a breadwinner in the family could work more comfortably using a wheelchair. In addition, the wheelchair was beneficial in mobility from one place to another.

"My child becomes much more independent, so I can look for a side job." (Caregiver, 46 years)

Respondents who were caregivers or parent proxies stated that they were able to go back to work full time and some for part-time work and were able to do work while taking care of their children.

Other respondents revealed that there was no difference in household income after using their wheelchair, but most participants expressed there is need for vocational training that may affect household income. The reason for this lack of change in income was that the wheelchair user was not the main person who earns money in the household.

Aside from affecting income, wheelchair use could also positively affect the spending of households. As moving becomes easier, wheelchair users can travel further and more often than previously without a wheelchair. Also using a wheelchair, it was easier for people with disabilities to engage in other activities outside their home. This empowerment trend indicates that wheelchair users become less dependent on caregivers or relatives to go from one place to another. In addition, their quality of life increased by having the opportunity to do other activities such as leisure and sightseeing outside their houses.

"Traveling becomes easier, my kid travels more often. She often goes out to buy snacks she likes; thus, my spending increases than before." (Caregiver, 46 years)

"Before using wheelchair I couldn't go for shopping, so I spend less." (Standard wheelchair user, 43 years)

There were several reasons why respondents report that wheelchair use does not affect household spending, such as, that it is the parents who took care of the disabled child, so that even with the use of wheelchair, there was no effect in household spending. Further, there was little or almost no maintenance cost for the wheelchair and if any, it is regarded as inexpensive.

4. Discussion

Monthly household income of most of the respondents (80%) is less than Rp 1,500,000 which is below the minimum wage (Yogyakarta province minimum wage is between Rp 1,454,200 – Rp 1,709,150). Around 18% of participants have a monthly income between Rp 1,500,000 to Rp 2,499,999, while the rest have more than Rp 2,500,000. This shows that the majority of respondents are middle to lower-income class. Since the majority of respondents are self-employed or informal workers, it may be difficult for them to remember days working and absent, which is possibly the reason not to answer this particular question. Among the respondents who answered, the result was *p*-value 0.087 ($p>0.05$), and there was no significant difference in the number of days spent working between 6 months before using a wheelchair and 6 months after using a wheelchair. Maybe, this result is not representative of all respondents due to the small number of respondenlifets who answered this question.

Our study found that there was time gap with an average of 10.5 years from the first-time respondents become disabled and needing a wheelchair, with the year they actually received the wheelchair. On average, respondents received the wheelchair in year 2009. It indicates that unaffordability, unavailability or lack of wheelchair provision services in the past have hindered the respondents to receive the wheelchair they needed.[12,13] Possible barriers to healthcare access were considerably greater for the people with disabilities.[14] Thus, this can potentially hamper them to attain a better health outcome.[15,16] In addition, without the appropriate wheelchair, mobility outside their homes becomes more difficult or not possible. This will lead to a poorer quality of life-possibly related to lack of opportunities and access to social activities, education, and employment. Further, while wheelchair services are not within their reach, the downstream costs related to illness such as decubitus and deterioration in physical function, potentially increases household

medical expenditures related to disability.[17] Those interacting barriers are hypothetically affecting households with people with disabilities in the way that alters households' potential for obtaining income, spending time in employment, as well as household spending while allocating more proportion on health care use. Therefore, cumulatively, the availability of wheelchairs potentially lessens the related economic burdens.

In this study, income before and after using adaptive wheelchair showed a significant difference, with an increased income after using an adaptive wheelchair. According to one study conducted by Shore,[18] there is an increased opportunity regarding employment of wheelchair users in Peru and Uganda, followed by an increase in income with time duration for follow-up observation of 30 months. However, the increase was not seen in Vietnam, which is possible because the data collection includes part-time employment and self-employment. Another study on impact of wheelchair provision in Ethiopia, comparing wheelchair users and non-wheelchair users, revealed a 6.7 US dollar higher income per week among wheelchair users.[19] However, household spending, and days absent from work showed no significant difference. The respondents' employment characteristics are mainly working as entrepreneur, which suggests that days of work can be flexible which is different from the nature of office work, where an employee is expected to be present at office during their working days. Household spending may affect households in terms of more spending on medical-related needs, repairs related to the wheelchair, or in terms of transportation costs.[17] As public transportation facilities for people with disabilities are not adequate presently, people mainly travel with their own vehicles. For wheelchair users, it can mean limited access to transportation, which usually means a modified motorcycle to carry the wheelchair, or a car with modification becomes the main type of vehicles that can be used by wheelchair users. Nevertheless, with the barriers related to transportation, it is likely that even with the wheelchair use, it was not followed by an increase in transportation costs. Furthermore, for medical needs related to the disability condition, more than 80% of the respondents are covered by health insurance, which possibly covers most of their spending on health care, including the cost of wheelchair services.

According to the qualitative results from the respondents, we found that although not directly increasing the income of some households, wheelchair use increases a person's mobility inside and outside their house from one place to another, and participation in social activities. These findings are in line with the study that wheelchair use improved participation, integration, and independence.[20,21] In contrast, another study revealed that with wheelchair use, there is relatively no change in the travel distance overtime for 30 months. An increased traveling distance was observed in the first year, however not until the end of the study period.[18]

One limitation of this study was that the interviews were conducted in October 2017, while the average respondents began using a wheelchair in 2009, which might cause some recall bias to occur. Another limitation related to time constraints was the short six months period after using wheelchair may not show significant change in household income. Further studies need to be conducted with communities from more diverse socio-economic groups, and with different criteria for the year of starting wheelchair use to minimize the possibility of recall bias.

5. Conclusion

Wheelchair use can positively impact on household income for persons with disabilities in rural areas in Central Java. This finding is indicated by the increase in household income in the span of six months from before to after obtaining wheelchair service.

In addition, given the significant benefits of wheelchair service for empowering people with disabilities, policymakers need to consider the existence of a comprehensive supplying and

financing structure to ensure the availability and accessibility of wheelchair services and to provide equal opportunities for persons with disabilities to get appropriate wheelchair services.

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Conflict of interest

There is no conflict of interest.

References

1. World Health Organization. Guidelines on the provision of manual wheelchairs in less resourced settings; 2008
2. UCPRUK-UCPWFH. Jaminan Kesehatan Khusus Penyandang Disabilitas; 2016.
3. United Nation. Convention on the Rights of Persons with Disabilities; 2016
4. Shields M. Use of wheelchairs and other mobility support devices. Health reports. 2004;15(3):37.
5. Furlong M, Connor JP. The measurement of disability-related stress in wheelchair users. Archives of physical medicine and rehabilitation. 2007;1;88(10):1260-7.
6. Visagie S, Scheffler E, Schneider M. Policy implementation in wheelchair service delivery in a rural South African setting. African Journal of Disability. 2013;2(1).
7. McSweeney E, Gowran RJ. Wheelchair service provision education and training in low and lower middle income countries: a scoping review. Disability and Rehabilitation: Assistive Technology. 2019; 2;14(1):33-45.
8. Toro ML, Eke C, Pearlman J. The impact of the World Health Organization 8-steps in wheelchair service provision in wheelchair users in a less resourced setting: A cohort study in Indonesia. BMC Health Services Research. 2015; 16(1):26.
9. Williams E, Hurwitz E, Obaga I, Onguti B, Rivera A, Sy TR, Kirby RL, Noon J, Tanuku D, Gichangi A, Bazant E. Perspectives of basic wheelchair users on improving their access to wheelchair services in Kenya and Philippines: a qualitative study. BMC international health and human rights. 2017;17(1):22.
10. Bray N, Noyes J, Edwards RT, Harris N. Wheelchair interventions, services and provision for disabled children: a mixed-method systematic review and conceptual framework. BMC health services research. 2014;14(1):309.
11. Mukherjee G, Samanta A. Wheelchair charity: A useless benevolence in community-based rehabilitation. Disability and rehabilitation. 2005;27(10):591-6.
12. Hunt PC, Boninger ML, Cooper RA, Zafonte RD, Fitzgerald SG, Schmeler MR. Demographic and socioeconomic factors associated with disparity in wheelchair customizability among people with traumatic spinal cord injury. Archives of Physical Medicine and Rehabilitation. 2004;85(11):1859-64.
13. Borg J, Östergren PO. Users' perspectives on the provision of assistive technologies in Bangladesh: awareness, providers, costs and barriers. Disability and Rehabilitation: Assistive Technology. 2015;10(4):301-8.
14. Stillman MD, Bertocci G, Smalley C, Williams S, Frost KL. Healthcare utilization and associated

barriers experienced by wheelchair users: A pilot study. Disability and health journal. 2017;10(4):502-8.

15. Sanchez J, Byfield G, Brown TT, LaFavor K, Murphy D, Laud P. Perceived accessibility versus actual physical accessibility of healthcare facilities. Rehabilitation Nursing. 2000;25(1):6-9.
16. Vergunst R, Swartz L, Mji G, MacLachlan M, Mannan H. 'You must carry your wheelchair'–barriers to accessing healthcare in a South African rural area. Global health action. 2015;8(1):29003.
17. World Health Organization. WHO global disability action plan 2014-2021: Better health for all people with disability. World Health Organization; 2015.
18. Shore S. The long-term impact of wheelchair delivery on the lives of people with disabilities in three countries of the world. African Journal of Disability (Online). 2017;6:1-8.
19. Grider J, Wydick B. Wheels of fortune: The economic impacts of wheelchair provision in Ethiopia. Journal of Development Effectiveness. 2016;8(1):44-66.
20. Kusumastuti P, Pradanasari R, Ratnawati A. The problems of people with disability in indonesia and what is being learned from the world report on disability. American journal of physical medicine & rehabilitation. 2014;93(1):S63-7
21. Visagie S, Mlambo T, Van der Veen J, Nhunzvi C, Tigere D, Scheffler E. Impact of structured wheelchair services on satisfaction and function of wheelchair users in Zimbabwe. African Journal of Disability. 2016;5(1).

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Problems related to acute respiratory infection among under-5 children in Sorong, West Papua: A community diagnosis approach

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ABSTRACT Acute respiratory infections (ARIs) are the leading cause of morbidity and mortality in children under five years, with a periodic prevalence of 25.9% in West Papua (2013). This study aims to explain the factors associated with ARIs in under-5 children in Sorong District, West Papua. This cross-sectional study was conducted in two districts, where trained medical students interviewed 135 mothers/caregivers by using a structured questionnaire and interviewed cadres and health workers for qualitative observation. About 85.5% of respondents stated that their children had ARIs in the previous two weeks (n=135), much higher than the data from Sorong District Health Office, which only reached 24.63%. Dominant risk factors were large household size, smoking at home, and improper handwashing habits. Only half of the respondents went to a physician in a primary care facility. Nearly half of the respondents had difficulty in accessing the facility. The majority of caregivers used over-the-counter or traditional medicine. Around 70% of respondents in Makbon Subdistrict did nothing to prevent the transmission of ARIs among children. ARIs remains a massive problem in the Sorong District. We need to educate the mothers/caregivers about the rational use of medicine and the prevention of ARIs, and also advocate for better access to clean water, sanitation, and healthcare facilities.

KEYWORDS acute respiratory infection; toddlers; West Papua

1. Introduction

Acute respiratory infections (ARIs) includes all infections in the upper and lower respiratory tract. This infection is a significant cause of morbidity and mortality in children under five years old (toddlers) in developing countries.[1] Considering the fact, it turns out that many respiratory infections are pneumonia, which has a high risk of mortality. The Ministry of Health of the Republic of Indonesia through Basic Health Research (Riskesdas) reported the periodic prevalence of ARIs in Indonesia, which reached 25.5% in 2007 and was still at 25.0% in 2013. This prevalence varies between all provinces, with the West Papua Province reaching 25.9%. The age group of 1-4 years had the highest rate of ARI in Indonesia, with a prevalence of 25.8%. The periodic prevalence of pneumonia in Indonesia has decreased from 2.1% in 2007 to 1.8% in 2013, with the West Papua Province below at 1.3%.

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The integrated management may influence years of reduction in morbidity and mortality in child disease programs that have been started in primary care more than a decade ago.

ARIs are still the most common diseases in Sorong District, West Papua Province, for many years. Data from the Sorong District Health Office showed ARIs was ranked first in the list of 10 most common diseases in 2012-2014, with prevalence ranging from 25-27%. This fact needs to be investigated further both from the implementation of the program in the government primary health center (PHC) as well as other factors such as the environment and culture that may influence case finding and management of ARIs.

The purpose of this study is to explain the factors that influence ARIs in children under five in Sorong District, West Papua Province.

2. Methods

2.1 Study design

This study is a cross-sectional study that combines quantitative and qualitative findings conducted in two districts in Sorong District.

2.2 Research subjects and data collection

Data collection was conducted quantitatively and qualitatively in two districts (Makbon and Klamono Subdistricts) in May and June 2015. The two districts were selected based on the ease of permit for the survey. A total of 135 quantitative survey respondents who were housewives or caregivers were selected from households with children under five and interviewed based on a structured questionnaire that included demographics, caregiver behavior, risk factors for ARIs, and access to health facilities. Interviewers are previously trained medical students for the purpose of the study.

Qualitative methods were used to explore further the problems that exist in the community and health services, concerning the regional data about demographics, health services, and PHC evaluation reports. The authors of this study interviewed the head of the PHCs, health cadres, patients, and officers from the District Health Office. In particular, interviews were directed to find out more about problems related to access to health facilities, patterns of self-medication behavior, and established health services. In each interview, one author performed as the interviewer and another as the notetaker. After the interview, the authors compiled the information and assessed all field notes for themes across different backgrounds of the key informants.

2.3 Data analysis

Quantitative findings were analyzed descriptively, based on demographic backgrounds, presence of ARI, and its risk factors. Qualitative findings were used to explain quantitative findings more in-depth. The authors assessed the field notes for striking keywords or themes to find a pattern or matrix of how subjects would respond to the symptoms of ARIs against their demographic background.

2.4 Research ethics

The Ethics Committee of the Faculty of Medicine, Universitas Indonesia has approved research ethics.

3. Results

A total of 135 women respondents from Makbon and Klamono Subdistricts were interviewed to obtain quantitative data, with 16.3% of them from Klawana Village, 11.1% from Klalomon Village, 43.0% from Klamono Village, 25.9% from Makbon Village, and 3.7% from Wariau Village. The demographic characteristics of the respondents are summarized in Table 1.

From Table 1, nearly half of caregivers were found to have a quite good academic background, namely completing high school or higher education (28.9% and 20.0%, respectively). However, many are unemployed or become farmers (36.6 % and 26.1%, respectively). An officer from the District Health Office gave government data showing that only 24.9% of women from the labor force in the district have completed high school or higher education.[2]

Table 1. Demographic characteristics of patients

Variable	n (%)
Age group (n=131)	
≤20 years	14 (10.7)
21-30 years	47 (35.9)
31-40 years	53 (40.5)
>40 years	17 (13)
Academic background (n=135)	
Never going to school	12 (8.9)
Not completing elementary school (SD)	10 (7.4)
Completed elementary school (SD)	16 (11.9)
Completed junior high school (SMP)	31 (23)
Completed high school (SMA)	39 (28.9)
Completed higher education	27 (20.0)
Occupation (n=134)	
Unemployed	49 (36.6)
Civil servants (PNS)	22 (16.4)
Private employees	7 (5.2)
Students	1 (0.7)
Traders	6 (4.5)
Farmers	35 (26.1)
Laborers	1 (0.7)
Fishermen	1 (0.7)
Others	12 (9.0)
Household income (per month) (n=126)	
No regular income	5 (4)
Less than IDR 500.000	45 (35.7)
IDR 500.000-1.000.000	25 (19.8)
IDR 1.000.001-5.000.000	46 (36.5)
>IDR 5.000.000	5 (4)

The different population that does not include housewives may cause discrepancy, although this discrepancy may also give an idea that our subjects are more educated than the general population. Different businesses between the districts may influence the high education background in the community since the Klamono Subdistrict had oil refinery. Nearly 40% of respondents have low household income (less than IDR 500,000 per month).

Table 2 shows the proportion of children under five with ARIs that was still high. More than half of the respondents reported symptoms of ARIs (cough or runny nose) within two weeks before data collection (85.5%). Self-treatment behavior before seeking medical treatment was found to be high. Many of the caregivers self-treat their toddlers with over-the-counter or traditional medicines or tell their children to rest and adjust their children's nutritional intake. The most

Table 2. Caregiver behavior of children under five with ARIs

Variable	n (%)
Children had ARIs within two weeks before data collection (n=135)	112 (85.5)
Children with ARIs during the data collection (n=135)	71 (53.4)
Self-treatment behavior before seeking medical care (n=104)	
Over-the-counter medicine	38 (36.5)
Traditional medicine	22 (21.2)
Rest	28 (26.9)
Rest with adequate nutritional intake	15 (14.4)
Others	1 (1.0)
Medical care-seeking behavior (n=129)	
PHC physicians	69 (53.5)
Private physicians	14 (10.9)
Hospitals	3 (2.3)
Midwives	11 (8.6)
Nurses	34 (25.6)
Others	4 (3.1)
Reason to seek medical care (n=127)	
Cough	30 (23.6)
Runny nose	7 (5.5)
Cough and runny nose	58 (45.7)
Additional symptoms besides cough or runny nose	22 (17.3)
No improvement with self-treatment	10 (7.9)
Prevention of disease transmission (n=35)	
Cover the mouth and nose	7 (21.2)
Sleep in a separate room	3 (9.1)
Do nothing	23 (69.7)

commonly used traditional medicine is a mixture of lime and soy sauce, which has been passed down from generation to generation. Other traditional medicines are boiled leaves of bitter melon (*Momordica charantia*).

In general, caregivers will bring their toddlers to medical care when the child shows symptoms of ARIs. However, there were 17.3% of respondents who will start considering bringing their toddlers for treatment when there were additional symptoms other than cough and runny nose and 7.9% of respondents who did it when there was no symptom improvement with self-medication. Also, only around half of the respondents seek medical care at the PHC, while the rest go to private practices, hospitals, midwives, nurses, or others.

From interviews with several caregivers, they said that the causes of ARIs include viruses, inhaled dust, and rain showers. In general, they also know that ARIs can be transmitted through the air. However, from the survey, about 70% of respondents in the Makbon Subdistrict did nothing to prevent the spread of ARIs. Regarding environmental factors that can affect the occurrence of ARIs, rain is the thing most often expressed by caregivers.

Table 3 shows the ARIs risk factors in

Table 3. Risk factors of ARIs

Variable	ARIs in the past two weeks (n, %)		*P*	Prevalence ratio
	Yes	No		
Number of household members (n=135)				
≤4	33 (82.5)	7 (17.5)	0.519	0.83
>4	79 (86.8)	12 (13.2)		
Smoking at home (n=134)				
Yes	97 (87.4)	14 (12.6)	0.301	1.1
No	15 (78.9)	4 (21.1)		
Proper handwashing behavior of caregivers (n=130)				
Yes	43 (81.1)	10 (18.9)	0.311	0.81
No	64 (87.7)	9 (12.3)		
Caregivers teach children how to wash their hands (n=121)				
Yes	93 (85.3)	16 (14.7)	0.596	0.85
No	8 (100.0)	0 (0.0)		

respondents. More than two-thirds of respondents have >4 family members who live together at home. Also, as many as 85% of respondents said there was smoking behavior at home, either done by parents or other family members. Regarding hand washing habits, 93.1% of respondents taught their children how to wash their hands, even though almost 60% of respondents did not know the proper method of handwashing. However, none of the risk factors were significant to the prevalence of ARIs in the community. The prevalence of ARIs was slightly higher in respondents with indoor air pollution, but not in respondents with overcrowded homes and poor hand hygiene.

Regarding access to health facilities, Table 4 shows that although more than half of the respondents (62.2%) did not need to spend transportation fee to health care facilities, almost half (47.8%) had difficulty reaching health facilities.

Problems with access to health facilities were found in respondents living far from the PHC. In the two districts that were surveyed, Klamono Health Center was still close enough to the respondents interviewed, whereas, in the Makbon Subdistrict, there were respondents from two villages far from the Makbon Health Center (2-5 km). As many as 40% of respondents walked to the PHC, and the rest mostly used motorcycle taxis (28.6%) or private transportation (25.6%). However, based on the narrative of health staff in both PHCs, some villages can only be reached by boat because they need to cross the river. The Head of the Klamono Health Center said, “The village farthest from here must be reached through the sea, by using a longboat for about three hours.” Similar conditions were found in the Makbon Subdistrict. “Our village has to be reached through the sea,” said the Head of Makbon Health Center. Estimates of the distance from the PHCs in the Klamono and Makbon Subdistricts to the respondent’s living area can be seen in Figure 1 and Figure 2.

To reach remote villages, both PHCs make regular visits to the villages once a month in a program called “Mobile Health Center” (Pusling). Activities carried out during the Pusling included Maternal and Child Health (KIA) program, outpatient care, Family Planning (KB), health screening, and anthropometric measurements of children under five at the Integrated Care Post (Posyandu).

4. Discussion

Based on Basic Health Survey published by the

Table 4. Access to health facilities

Variable	n (%)
Having difficulty reaching health facilities (n=134)	
Yes	64 (47.8)
No	70 (52.2)
Mode of transportation to health facilities (n=133)	
On foot	54 (40.6)
Motorcycle taxi	38 (28.6)
Public transport	4 (3.0)
Private transportation	34 (25.6)
Walk or using a motorcycle taxi	1 (0.8)
Walk or using private transportation	2 (1.5)
Travel time to health facilities (n=131)	
≤15 minutes	84 (64.1)
16-30 minutes	25 (19.1)
31-45 minutes	1 (0.8)
46-60 minutes	16 (12.2)
61-120 minutes	5 (3.8)
>120 minutes	0 (0.0)
Round-trip transportation costs (n=135)	
No fees	84 (62.2)
IDR 5,000	1 (0.7)
IDR 10,000	9 (6.7)
IDR 15,000	1 (0.7)
IDR 20,000	34 (25.2)
IDR 30,000	4 (3.0)
IDR 50,000	2 (1.5)

Ministry of Health of the Republic of Indonesia, West Papua is one of the provinces with a high periodic prevalence of ARIs.[1] Data from the Sorong District Health Office in 2014 showed the prevalence of ARIs as much as 24.63%. The results of this study show that the proportion of children under five who experience ARIs symptoms in the past two weeks as much as 85.5%, and during the data collection was 53.4%. The symptoms most often complained of by toddlers based on caregiver reports are coughing and runny nose.

Children under five are indeed the most vulnerable group to experience ARIs, where several other studies also indicate this condition.[3–5] They are more susceptible to infection because their immune systems are immature.[6] Children are also known to spread the virus in longer duration than adults.[7]

Environmental factors also play a role, with caregivers interviewed saying that ARIs are more common during the rainy season. This finding is consistent with other studies that show an association between temperature and humidity with the ARIs transmission.[8–11] Reduced duration of skin exposure to the sun during the rainy season also reduces vitamin D intake, and vitamin D

Figure 1. Estimated distance from the PHC to Respondents' Living Area in the Klamono Subdistrict (Source: Google Maps)

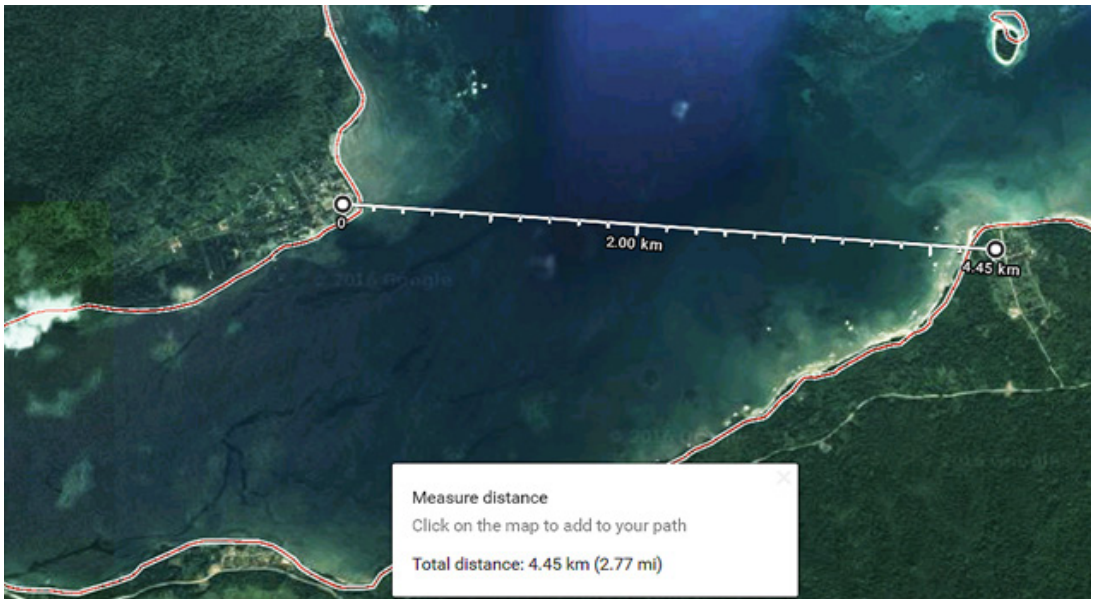

Figure 2. Estimated distance from the PHC to Respondents' Living Area in the Makbon Subdistrict (Source: Google Maps)

deficiency has been known to disrupt the body's antimicrobial system, thus increasing the risk of ARIs.[12] However, this study only collected data during the rainy season, so there is no data on the proportion of inter-season ARIs proportions.

The risk factors associated with ARIs found in this study included an overcrowded home, smoking behavior at home, and improper handwashing habit. We found that the prevalence of ARIs was higher in respondents with indoor air pollution. Other studies in Papua,[13] Aceh,[9] Java,[10,11], and Kalimantan[14,15] highlighted the dangers of overcrowded home and indoor air pollution, including smoking habits at home. The number of

smokers was said to be proportional to the number of sufferers of health problems. Based on studies in China,[16] India,[17], and Malawi,[4] an overcrowded home and smoking habit at home increases the risk of ARIs in children under five. Exposure to tobacco smoke is known to cause ill health and mortality in children, especially among those under five years of age.

Another factor that plays a role in the transmission of ARIs was children's behavior who are less accustomed to maintaining hand hygiene so that they can get the infection from the people around them. This factor is more dominant in toddlers aged >2 years since they have actively begun to interact with their surroundings and are more exposed to the unhygienic environment, as documented by a study in Aceh.[18] In this study, many respondents did not have the proper habit of washing their hands so they could not teach their children how to wash their hands properly.

An external factor that can affect the high proportion of ARIs in children under five is difficult accessibility to health facilities. Nearly half of the respondents (47.8%) had difficulty going to health facilities, and only around half of the respondents (53.5%) went to the primary care physician at the PHC for treatment. Residents who live far from health facilities also experienced this problem, for example, from areas that can be only reached by boat. This limited access to healthcare prevents the population from getting appropriate management for their illness, as also noted in a study by Cox, et al.[4] A study in Australia shows that rural dwellers have a significantly lower likelihood of reporting ARIs compared to urban dwellers.[5]

The caregivers' behavior, when their toddlers have ARIs, is also a factor that influences the high proportion of ARIs. Self-treatment behavior was found to be quite high. More than half of the respondents use over-the-counter and traditional medicines, even though 83.7% of caregivers are well educated. This finding is different from the study in Pakistan, where 97% of caregivers with an urban background were well educated, and self-medication behavior was only 6%.[19] A similar study in Hyderabad, India, shows that around 29% of mothers with mostly good academic background tried to manage their child with cough/fever syrup, probably due to limitations in the affordability and accessibility of primary healthcare.[20] Our respondents sought medical treatment when their toddlers showed symptoms of coughing and runny nose, with only 7.9% of respondents seeking medical treatment when their child's condition did not improve. This finding was a very positive factor that might be influenced by mostly high education background of the caregivers, with similar findings showed in the study by Challa et al.[20] However, although many respondents sought medical care, only half of them went to the physician at the PHC. The fact that most respondents were eager to seek medical treatment despite having difficulty in accessing a primary health facility showed the potential for community-based treatment training for ARIs as performed and documented by Cahyaningsih et al. in Bandung, West Java.[21]

Regarding prevention, the caregivers' awareness level is still relatively low, despite their mostly good academic background. In Makbon Subdistrict, 70% of respondents did nothing to prevent the spread of ARIs. This behavior causes ARIs to be easily transmitted to other children. Higher education tends to affect the knowledge and decision-making process, as noted in a study by Anggraini et al.[8] In the study, only 7% of parents with high education level had an unhealthy behavior, in contrast with the percentage of 41% in those with lower education level. However, this was not what we founded in Sorong District. In Sumatera, a study by Handayuni, et al. found that the knowledge of ARIs and the related preventive efforts were still lacking among mothers, probably due to misperception about the severity of ARIs.[22] However, it did not specify their academic background.

Limitations of this study include the criteria used to diagnose ARIs. In this study, only two main symptoms of ARIs were identified, namely coughing and runny nose. Also, the selection of respondents did not cover areas that are far from the PHCs, but

still within 5 km from the PHCs, so the findings in this study may not represent the entire region. The short duration of the study also does not make it possible to assess inter-season effects on the proportion of ARIs.

5. Conclusion

Factors that may affect the high rates of ARIs in children under five in Sorong District consist of overcrowding, smoking at home, improper handwashing habit, difficult access to healthcare facilities, cultural factors related to irrational treatment, and the lack of knowledge about the prevention of disease transmission. However, different cultural and environmental factors should be considered before applying the results for other districts in West Papua. Dissemination of information for mothers and caregivers is necessary: first, regarding the proper use of over-the-counter drugs, including antibiotics that can be bought without a prescription, so that it may not harm their toddlers; second, about the transmission of the disease so that they can take appropriate precautions. Advocation for better access to clean water and sanitation and better access to healthcare facilities is also necessary.

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References

1. Riset Kesehatan Dasar 2013. Jakarta: Badan Penelitian dan Pengembangan Kementerian Kesehatan Republik Indonesia; 2013.
2. Kabupaten Sorong dalam Angka 2014. Sorong: Badan Pusat Statistik Kabupaten Sorong; 2014.
3. Krishnan A, Amarchand R, Gupta V, Lafond KE, Suliankatchi RA, Saha S, et al. Epidemiology of acute respiratory infections in children - preliminary results of a cohort in a rural north Indian community. BMC Infect Dis. 2015;15 (1):462.
4. Cox M, Rose L, Kalua K, de Wildt G, Bailey R, Hart J. The prevalence and risk factors for acute respiratory infections in children aged 0-59 months in rural Malawi: A cross-sectional study. Influenza Other Respir Viruses. 2017 (6):489–96.
5. Chen Y, Williams E, Kirk M. Risk factors for acute respiratory infection in the Australian community. PLoS ONE. 2014;9(7):e101440.
6. Kinanthi CA, Notobroto HB, Martini S. Determinants of Acute Respiratory Infections Among Child Under Five Years in Surabaya. Health Notions. 2018;2(3):380–2.
7. Bridges C, Kuehnert M, Hall C. Transmission of influenza: implications for control in health care settings. Clin Infect Dis. 2003;37:1094–101.
8. Anggraini T, Mudigdo A, Soemanto RB. Association Between the Socioeconomic Factors, Healthy Home, and Healthy Behavior Among Parents of Toddler with Acute Respiratory Infection in Kediri, Indonesia. J Epidemiol Public Health. 2016;1(1):66–74.
9. Sofia S. Faktor Risiko Lingkungan dengan Kejadian ISPA pada Balita Di Wilayah Kerja Puskesmas Ingin Jaya Kabupaten Aceh Besar. AcTion Aceh Nutr J. 2017;2(1):43–50.
10. Sari DA, Budiyono B, Darundiati YH. Hubungan antara Kualitas Udara dalam Ruang dengan Kejadian Pneumonia pada Bayi di Wilayah Kerja Puskesmas Bandarharjo Kota Semarang.

Media Kesehatan Masyarakat Indonesia. 2019;18(3):12–8.

11. Fahdiyani R, Raksanagara AS, Sukandar H. Influence of Household Environment and Maternal Behaviors to Upper Respiratory Infection among Toddlers. Kesmas Natl Public Health J. 2016;10(3):120–6.
12. Narang GS, Arora S, Kukreja S, Shifali D. Association of Vitamin D Deficiency with Acute Lower Respiratory Infection in Toddlers. J Nepal Paediatr Soc. 2016;36(1):14–6.
13. Gainau E, Rantetampang A, Pongtiku A, Mallongi A. Factors Influence of Acute Respiratory Infection Incidence to Child Under Five Years in Timika Jaya Health Primary Mimika District. International Journal of Science & Healthcare Research. 2019;4(1).
14. Hidayah N, Rahman TA, Salmarini DD. Household Environment Factors Associated With Acute Respiratory Infection (Ari) Among Under-Five Children. In Atlantis Press; 2017 [cited 2019 Nov 17]. Available from: https://www.atlantis-press.com/proceedings/smichs-17/25886852
15. Meilantika AD, Hadisaputro S, Mexitalia M, Sakundarno M, Rahardjani KB. Study of Family Behavior that At Risk For Pneumonia in Under Five Children in Mempawah District. Health Notions. 2018;2(4):490–3.
16. Huai Y, Guan X, Liu S, Uyeki TM, Jiang H, Klena J, et al. Clinical characteristics and factors associated with severe acute respiratory infection and influenza among children in Jingzhou, China. Influenza Other Respir Viruses. 2017;11(2):148–56.
17. Kumar G, Majumdar A, Kumar V, Naik B, Selvaraj K, Balajee K. Prevalence of acute respiratory infection among under-five children in urban and rural areas of puducherry, India. Journal of Natural Science, Biology and Medicine. 2015;6(1):1–6.
18. Safitri F, Hayati R, Marniati. Analysis of risk factors for acute respiratory tract infections (ARI) of Toddlers in Ingin Jaya community health centre of Aceh Besar district. AIP Conf Proc. 2017;1885(1):020037.
19. Bham SQ, Saeed F, Shah MA. Knowledge, Attitude, and Practice of mothers on acute respiratory infection in children under five years. Pak J Med Sci. 2016;32(6):1557–61.
20. Challa S, Krosuri V. Danger signs of acute respiratory tract infections in under-five children: awareness among mothers in the urban slums of Hyderabad, its relation to treatment seeking behaviour. Int J Community Med Public Health. 2018;6(1):190–6.
21. Cahyaningsih H, Kusmiati S, Husni A. The Effectiveness of Treatment Training for Children with Acute Respiratory Tract Infection to Mothers of Toddlers in Bandung Indonesian. Open J Nurs. 2017;7(7):759–69.
22. Handayuni L, Alfian AR, Amran A, Razak A. Knowledge of mother about the household environment againt acute respiratory infection in Padang Pasir: A literature study. IOP Conf Ser Earth Environ Sci. 2019;314(1):012076.

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Parenting pattern of feeding in stunting toddlers at the working area of Tegallalang I Primary Health Centre

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ABSTRACT Stunting is a growth disorder that affects the measurements of length-for-age or height-for-age, which is characterized by a body condition that tends to be short. Children under five are categorized as short-bodied if the z-score is less than -2 standard deviation. In Indonesia, approximately 29% of children under five are included in the short-bodied category. A good nutritional intake at this time is a depiction of proper growth and development in the future. The health status of infants is related to parenting patterns of feeding. This study aimed to find out the description of parenting patterns of feeding in stunting toddlers in the working area of Tegallalang I Primary Health Centre. The study belongs to qualitative research with a phenomenological approach. The sample of this study was 5 mothers who had stunting toddlers. Data were collected by applying a purposive sampling technique. Data that had been collected consists of two types, i.e., primary data and secondary data. Data were analyzed using thematic analysis techniques. Some respondents had fed their toddlers with exclusive breastfeeding until they were 6 months old, but the frequency of feeding was ruled out. In addition, most respondents had only started to feed their babies with complementary food for breastfeeding at the time they were 6 months old. Still, they had not paid attention to their nutritional needs, the precise frequency of feeding, the kinds of better food for toddlers, and appropriate food variations. These results indicate that the wrong parenting pattern of feeding in children under five has the potential to cause stunting. Therefore, more attention to this matter is necessarily needed to reduce the severe incidence of stunting.

KEYWORDS children under five years; parenting pattern of feeding, stunting

1. Introduction

Indonesia is included in 17 of 117 countries that have three nutritional problems in children under five, namely stunting, wasting, and overweight.[1] The problem concerning growth disorders such as short (stunting) in toddlers in Indonesia is still alarming. Stunting is a growth disorder characterized by a body condition that is short to beyond the deficit -2 standard deviation (SD) below the median height with the measurement of height-for-age.[2]

Based on a 2006 World Bank report on the Nadiyah's study (2014) regarding the big problem of stunting, a region is considered to have a mild stunting problem if the prevalence is between 20% to 29%, moderate if 30% to 39% and severe if more than or equal to 40 %.[3] In terms of gender, most male toddlers experience stunting (35.7%) compared to female toddlers (31.6%). Judging by region/territory, children who experience stunting are more commonly found in rural areas (36.9%) than in urban areas (30.9%).[3]

Based on the results of the Basic Health Research of Bali Province in 2013, the prevalence

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of stunting in Bali in 2013 was 32.6%, with the most cases occurring in Gianyar Regency with a prevalence of 41%.[4]

Based on data that was obtained from Tegallalang I Primary Health Centre in January 2018, it was stated that in the Tegallalang I area, there were 28 cases of stunting in children under five, especially in the working area of the Tegallalang I Primary Health Centre. Meanwhile, data from the Tegallalang I Primary Health Centre in April 2019 revealed that there were 46 cases of stunting in the working area of the Tegallalang I Primary Health Centre.

Uncreative and unvaried parenting feeding to toddlers is an important thing that needs to be considered by every mother so that their children's nutritional needs are met.[5] Based on the above description, this study examines the parenting feeding in stunting toddlers in the working area of the Primary Health Centre of Tegallalang I.

2. Methods

This study used a qualitative design with a phenomenological approach. The sample in this study were mothers who had stunting toddlers in the working area of Tegallalang Primary Health Centre I. The inclusion criteria to choose the sample of this study were: (1) the mothers who have stunting indicated toddlers (parameters having a z-score limit of less than -2 SD), (2) lived at the place of research conducted, and (3) willing to sign the informed consent. Meanwhile, the exclusion criteria were the mothers who had toddlers who did not indicate stunting, were not in the place at the time the study was conducted and were not willing to sign the informed consent. The sample of this study amounted to five mothers who had children with stunting who were selected by using a purposive sampling technique.

The interview was the instrument used to collect the data. The interview activities were stopped at the time the information needed was considered to have been completely met or until the results obtained are saturated and have reached data saturation through an in-depth interview. Data were analyzed thematically with a model of qualitative-verification analysis. After the data were collected, then they were classified to be able to draw a conclusion that refers to the theory and source of the literature based on the theme discovered.

3. Results

The subjects of this study came from different family backgrounds. Most of them already have jobs, some work as restaurant staff, administrative staff, and Village Credit Institutions (*LPD*) employees and as laborers. That was only one out of the five research subjects who are unemployed. In terms of education level, three study participants had the latest education in junior high school (*SMP*) and below, and two other participants had the last education of senior high school/vocational school (*SMA/SMK*) and above (Table 1).

Based on the results of in-depth interviews regarding exclusive breastfeeding, it was found that most respondents only gave exclusive breast milk to their babies before the age of 6 months. Some gave exclusive breast milk to their babies until the babies aged one year, two years old, even

Table 1. Subject characteristics

Subject	Age	Education	Occupation
KSD	28 years old	Junior high school	Restaurant staff
DMIJ	26 years old	Elementary	Unemployed
GASA	24 years old	Bachelor	Administrative staff
NWK	29 years old	Junior high school	Laborer
WW	28 years old	High school	Village Credit Institution employee

today. The mothers did not know the benefits of giving exclusive breast milk. They only followed the prescription given by the doctor or the health center concerned. The following is an except from the statement of one of the respondents:

"ASI manten nike kanti usia duang tiban. Keto orine dumun sareng dokter, yen sampun ngeling ye jangkutin tiang pun sareng bang nyonyo pang suud ngeling."

"I just breastfed my child until she was two months old. As suggested bu the doctor. Whenever she cries I hug and I breastfeed her until she stops crying."

(DMIJ)

Besides, there were some respondents who gave exclusive breast milk to their toddlers only until the toddlers were three months old. It was done because of the activities at their workplaces. The following is a quote from the statement of one of the respondents on this matter:

"Campur nike, dia dibantu susu formula juga. Awal-awalnya nike sekitar 1 minggu pertama tiang berikan susu formula karena ASI tidak keluar 4 sampai 5 hari, mungkin karena efek sakit setelah SC nike. Setelah pulang dari Ari Canthi wau pulih ASI eksklusif sampai sekitar 3 bulan karena tiang harus kerja juga".

"It was mixed. It was also assisted with formula milk. Initially, around the first week, I gave formula milk because breast milk did not come out in 4 to 5 days. It may be the effect of being sick after childbirth. After returning home from Ari Canthi, the breast milk works about 3 months. I also have to work."

(KSD)

In addition, there were respondents who did not give exclusive breast milk to their children from birth. This is because the production of breast milk of the informant in question is hampered. The following is a quote from a statement of one of the respondents on this case:

"Gak dapet ASI ini, gak mau keluar ASI nya, keluarnya ga lancar, sedikit-sedikit mungkin karena tiang habis operasi masih sakit berpengaruh juga sama stamina tubuh."

"There is no breast milk because it does not come out. Even if it's out, it's not as streamlined. Maybe it is because I have just been dissected and it still hurt, as a result it affected my stamina."

(GASA)

Regarding the frequency of breastfeeding, almost all respondents gave their toddlers exclusive breast milk for five to six times a day. The following is a statement from one of the respondents:

"Jek ten tentu, nyen sampun ngeling ye jangkutin tiang pun sareng bang nyonyo pang suud ngeling. Mungkin polih pang lima pang nem nike awai."

"That's uncertain. Whenever my little baby cries I hug and I breastfeed him until he stops crying. I may breastfeed him five to six times a day."

(DMIJ)

Based on the results of in-depth interviews regarding the provision of complementary food for breast milk (MP-ASI), it was found that most of the respondents began to give complementary food for breast milk when their toddlers were 6 months old. The complementary food for breast milk given begins with formula milk, porridge, or foods that are softened and until now the staple food in the form of rice has been given with one type of side dish and vegetable for each meal, such as eggs mixed with soy sauce, tofu, tempeh, fish or chicken. The following is a statement of one of the respondents:

"Mulai 6 bulan tiang bang bubuh sun, bubuh baas nike kabaang, mangkin sampun nasi nike sareng sayur, wortel sareng pindang demeninne nike."

"Starting from the age of 6 months, I fed my baby with SUN porridge and rice porridge. Now, I'm feeding him with rice and vegetables, carrots and pindang (fish), the vegetables he likes."

(DMIJ)

In addition, there are also respondents who had started to give complementary food for breast milk before their toddlers aged 6 months. This is because of their activities at the workplace and also the production of breast milk that was hampered. The following is a statement of one of the respondents on this matter:

"Karena awalnya nike ASI tiang ten nyak pesu, tiang kasi susu formula dumun selama seminggu, setelah nike karena sampun dados keluar tiang campur ASI sareng susu formula kanti usia 3 bulan, setelah nike karena tiang harus kerja, jadi ASI tiang stop, lanjut susu formula."

"Since my breasts did not bear milk initially, I gave my baby formula for a week. After that, as the breast milk had started to come out, I mixed them with formula milk until he was 3 months old. Because I had to work, I stopped breastfeeding and I replaced the breast milk with formula milk."

(KSD)

Regarding giving meat, all respondents gave meat to their babies. Most of their toddlers consume meat three times a week. Chicken is the most commonly consumed meat. The following is a statement of one of the respondents regarding this:

"Daging paling seminggu tiga kali nike, daging ayam paling sering, yen daging babi kapah, paling yen poling ngidih manten."

"I give meat at most three times a week. The meat I most often give is chicken. I rarely give pork, only when I get a gift."

(GASA)

Moreover, even though all the respondents give meat to their babies, there were also babies who did not like meat. They always refused or did not eat the meat given. The following is a quote of one of the respondents regarding this matter:

"Anak tiang ten demen ngajeng daging, daging napi manten tiang kasi selalu lepehine nike, padahal sampun tiang coba ganti-ganti bumbu dagingnya nike tapi tetep ten kayun."

"My child doesn't like meat. No matter what meat I'm giving him, he always vomits. Even when I'd tried replacing the spices but still he dislikes it."

(WW)

Regarding vegetables, almost all respondents always provide vegetables in every meal given to their babies and almost all their babies like vegetables. The most often given vegetables are vegetable soup, corn, carrots, kale, and long beans, and sometimes spinach was also given. The following is a statement of one of the respondents about this:

"Sayur demen ye jek sayur, sewai wai ngajeng sayur napi je tiang siapin jek ajenge pun, mangkin karena sampun dados ngomong kadang dia minta mau dibuatin sayur napi."

"My baby really likes vegetables. Any vegetable that I cook every day, he will eat them. Anymore, because now he is able to speak, he sometimes asks for his favorite vegetables."

(GASA)

In addition, even though all the respondents always provide vegetables in each food given to their babies, there are babies who did not like vegetables, sometimes there are certain vegetables that can be eaten or only the soup was consumed. The following is a quote of one of the respondents concerning this:

"Untuk sayur paling tiang buatin sup isi wortel sareng kacang panjang yang sampun dihalusin nike, seminggu pasti tiang sedian cuma untuk dimakan paling satu sampai dua kali kadang yen tiang buat sup kuah-kuah ne manten ajenge."

"For vegetables, I only make soup filled with carrots, plus long beans that I have sliced and ground. Within a week, I only give it once or twice, but often only the sauce is eaten."

(KSD)

In addition to provide meat and vegetables, fruit was also given to toddlers. Regarding the giving of fruit, all respondents rarely give fruit to their children, fruit is usually given to babies only during the religious ceremony moments. The following is a statement of one of the respondents on this:

"Yen buah kapah-kapah yen wenten odalan manten wau ngajeng buah hahaha."

"I rarely give my baby fruit. Only when there is a ceremony does he eat fruit. Huhuh!"

(DMIJ)

However, there were also respondents who provided fruit for their babies every day because they consider the fruit to be rich in vitamins that are useful for keeping their babies healthy. The following is a quote from one of the respondents about this:

"Buah kayun, awai-wai ngajeng buah care buah jeruk tiang beliang di pasar terus tiang taruh dikulkas. Tiang meliang buah apang sehat yee buah kan kaya akan vitamin nike hahaha."

"Every day my child eats fruit, like oranges. I bought it at the market and put it in the refrigerator. I buy fruit for my child health. You know, fruit is rich in vitamins. Huhuh!"

(KSD)

In terms of frequency and portion, mostly mothers gave basic food to their babies, such as rice, as much as one to two times a day. Regarding portion size, most children did not have a good appetite. The average child, at time being fed, does not eat it wholly. Some eat only half a plate and even just one to two spoons. The following is a quote of one of the respondents regarding this matter:

"Makan pokok paling sehari satu sampai dua kali, untuk porsinya setiap tiang suguhin satu porsi pasti ten telah, paling setengahnya."

"I give one to two staples. Every serving I serve, my baby eats, at most, only half."

(GASA)

In the habit of eating snacks, food that is often consumed by most of the children under five is snacks found in stalls and most are not controlled by parents. Most respondents gave their toddlers snacks from the stalls to keep them calm. The following is a statement of one of the respondents concerning this:

"Yen cemilan sebilang pesu nepuk dagang pasti ngeling dot meblanja yen sampung ngeling, ngambul bang tiang pun. Es krim, coklat, permen nike sai ajeng kanti telah gigi konyangan."

"For snacks, every time I take it out of the house and see the merchandise, he will definitely ask for snacks. When he cried and sulked, I gave him ice cream, chocolate, and candy, until he became toothless."

(DMIJ)

Additionally, there are also respondents who tried to control their children in buying snacks at the stall. They assumed that snacks in stalls do not have good nutrition for toddler growth. The following is a statement of one of the respondents on it:

"Kalau untuk cemilannya baru sekalinya dikasi terus kontinu ga berhenti-henti cuma cemilannya itu yang salah belinya di warung, karena biasanya pagi sampai siang kan tiang kerja nah disana neneknya yang ngerawat itu yang cemilannya beli di warung."

"For snacks, once I give, I give it continuously, it doesn't stop. It's just that, the snacks are bought in a stall, because I used to work from morning to noon. During that time, my baby are taken care of by his grandmother and the snacks are bought at the shop."

(GASA)

In the habit of eating snacks, food that is often consumed by most of the children under five was snacks found in stalls and most are not controlled by parents. Most respondents gave their toddlers

snacks from the stalls to keep them calm. The following is a statement of one of the respondents concerning this:

"Untuk variasi makanan memang jujur agak kurang, karena setiap pagi neneknya yang bikin pasti bubur nike, Cuma waktu niki polih dibuatkan labu tapi sangat jarang."

"Regarding the variety of foods, frankly, it is indeed lacking. Every morning my baby is made porridge by her grandmother. Pumpkin had been made, but it's very rare."

(KSD)

In addition, there are also respondents who changed the type of meal given to their toddlers every three days and there are also those who changed the type of their side dish every day. Toddlers also feel bored if they consume the same type of meal every day. The following is an excerpt of one of the respondents regarding this:

"Untuk lauknya setiap hari tiang ubah-ubah, daging bumbunya tiang ganti-ganti tiap hari, kadang tiang goreng, kadang tiang campur kecap. Sayur juga kadang tiang tumis kadang tiang jadiin sup."

"Side dishes for my baby change every day. Like meat, I change the marinade. Sometimes I fry and sometimes I mix with soy sauce. I even stir-fry the vegetables, and sometimes I make it into soup."

(WW)

4. Discussion

As stated in the previous section, the subjects of this study were five mothers who had stunting toddlers. They were selected according to the inclusion criteria. According to the results of the 2008 Semba study in Hanum's study in 2014, maternal education levels significantly impacted children's nutritional status.[6] Mothers who have a high level of education will have a positive impact on parenting feeding to toddlers. The increase in maternal education levels significantly affected the decline in the incidence of stunting in infants. Based on the type of work, four out of five research participants had jobs while one other participant did not, so that the time spent with her toddler is more. The respondents who had jobs, while working, entrusted their toddlers to their grandparents. According to the results of the 2005 Mamabolo's study in Hanum's study in 2014, working mothers are closely related to the provision of parenting patterns.[6] Stunting incidence increases in working mothers.

Based on the results of this study, it is found that most of the respondents had given exclusive breastfeeding to their toddlers before the age of 6 months. They did this based on the instructions given by the doctor or the health center. However, the incidence of stunting that occurs may be due to the frequency of giving less breast milk. Based on the results of the study, it was found that most respondents only gave exclusive breastfeeding to their toddlers as much as 5 to 6 times a day.

This is in accordance with the results of research conducted by Loya and Nuryanto regarding parenting giving to stunting toddlers aged 6 to 12 months in Central Sumba Regency, East Nusa Tenggara. From the study, it was found that respondents had given exclusive breast milk to their toddlers but were still stunting. This happens because it turns out that the frequency of breastfeeding is only between 4 and 10 times a day. Therefore, even breastfeeding had been given as a recommendation, the administration frequency is not stated in the rules that should have caused the incidence of stunting.[5]

However, there are also some respondents who did not give exclusive breast milk to their toddlers. This is caused by their busy work, in addition to unstreamlined breast milk. According to the 2014 Ministry of Health of the Republic of Indonesia, exclusive breastfeeding can reduce infant mortality by 13% and can reduce the prevalence of failed growth in Indonesia.[7] This is in accordance with Lestari's study in 2014 regarding risk factors for stunting in children aged 6 to 24 months in Penanggalan District, Subulussalam City, Aceh Province. From the results of the study, it was found that the incidence of stunting was more commonly found in infants who were not given

exclusive breast milk (61.7%) compared to those who were given exclusive breast milk (29.4%).[8]

Based on the results of the research described above, it was found that most of the respondents began to provide complementary food for breast milk when their toddlers were 6 months old. However, the stunting incidence that occurs may be a result of the frequency and inadequate portion of food that is unable to meet all the nutritional needs of a toddler's body. The intake of nutrients that are less likely due to the composition of the quantity of food consumed is wrong or even the quality of food is bad. The principle of feeding toddlers by respondents does not prioritize children's nutritional needs. The habit of respondents in the principle of feeding toddlers, in general, is the toddlers are fed to be full and not fussy. Feeding the infants is also adjusted to what is edible to adults, and most respondents do not provide varied food.

This is consistent with the research conducted by Loya and Nuryanto in 2017 regarding the pattern of parenting feeding to stunting toddlers aged 6 to 12 months in Central Sumba Regency, East Nusa Tenggara. From the results of the study, it was found that the respondents had provided complementary breast milk to their toddlers at the age of 6 months but experienced stunting. It turned out that the frequency of providing complementary breast milk to infants was not in accordance with the recommendations of the Ministry of Health of the Republic of Indonesia. It suggested that the right amount of food for infants aged 6 to 12 months is pulverized or soft food with the frequency of giving 3 times a day with a size of 6 to 12 tablespoons.[5] In the study, it was found that the provision of complementary food for breast milk ranged between 2 to 3 times with a dose of 2 to 6 tablespoons in one time feeding per day.

In the results of the research conducted, it was found that the staple food consumed was porridge and rice. Toddlers are also more often fed with one type of side dish or vegetable for each meal, such as eggs, tofu, tempeh, soup, fish, or chicken. All respondents always provide vegetables every day. Vegetables given are soup, spinach, corn, carrot, kale, and long beans. In terms of providing vegetables, most toddlers like vegetables, but some only want to eat the sauce. Meat consumption, such as chicken, is not done every day. Most respondents provide meat only 3 times a week. For fruit consumption, giving fruit to toddlers is not done every day or routinely in a week but is mostly done at certain moments, such as when a religious ceremony is held. If this pattern of feeding long last can cause growth disorders.

Referring to the instruction of the Ministry of Health of the Republic of Indonesia in 2014, the dietary pattern is the most important behavior that can affect the state of nutrition. This is because the quantity and quality of food and beverages consumed will affect the level of health of individuals and society. In Indonesia, this principle is known as balanced nutrition guidelines. The balanced nutrition guideline is the consumption of daily meals must contain nutrients in the type and amount (portion) that fits the needs of each person or age group. Foods that are good to consume must contain carbohydrates, protein, vitamins, minerals and fiber in sufficient quantities, not excessive and carried out regularly.[9]

This is in accordance with the research conducted by Adriani and Kartika in 2013 regarding parenting styles for children under-fives with malnutrition in East Java, Central Java and Central Kalimantan. From the results of the study, it was found that the nutritional intake received by infants is very dependent on parents' parenting feeding. Potential eating habits, namely only by providing rice and vegetables to babies without meeting other nutritional needs, have an effect on the baby's linear growth.[10,11]

Low birth weight (LBW) has a very strong relationship with the health and survival of newborns. Besides being able to disrupt the growth and development of the baby, this condition can also interfere with cognitive growth and development as well as vulnerability to chronic diseases in the future. Babies born with LBW tend to be difficult to catch up with early growth. The lag of growth will cause children to become stunting.[12]

The impact of infection on growth, such as decreased bodyweight due to loss of appetite, so that energy and nutrient intake is very lacking for body needs. If this condition occurs for a long time and is not immediately addressed, a disruption in growth will occur.[13] The effect of exclusive breastfeeding on changes in stunting status is caused by the function of breast milk as immunity and antibodies to prevent infection. Babies who do not get exclusive breastfeeding will be more susceptible to disease, which later can affect their growth and development.[14] The number of children is not a risk factor for the incidence of stunting because the number of families who have children more than two people is not small, in which respectively one of their children has worked and is able to live independently. This means that the burden on parents to support their children is reduced.[15]

5. Conclusion

The wrong parenting feeding for toddlers has the potential to cause stunting. Regarding the pattern of exclusive breastfeeding in stunting infants in the working area of the Public Health Centre of Tegallalang I, most respondents have given only exclusive breast milk to children under the age of 6 months but set aside the frequency in delivering it. Besides, most of the respondents began to provide complementary food for breast milk to toddlers when they were 6 months old ignored their nutritional needs, the frequency of proper feeding, the type of food that is good for growth and variety of foods.

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References

1. Global Nutririon Report. 2014. Nutrition Country Profile Indonesia. International Food Policy Research Institute.
2. WHO. 2010. Nutrition Landscape Information System (NLIS) Country Profile Indicators. Geneva.
3. Nadiyah N, Briawan D, Martianto D. 2014. Faktor Risiko Stunting pada Anak Usia 0-23 Bulan Di Provinsi Bali, Jawa Barat, Dan Nusa Tenggara Timur, *Jurnal Gizi dan Pangan*, Juli 2014;9(2): 125-132.
4. Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan Republik Indonesia. Riset Kesehatan Dasar (Riskesdas). 2013. Profil Kesehatan Provinsi Bali Tahun 2013.
5. Loya R and Nuryanto. 2017. Pola Asuh Pemberian Makanan Pada Balita Stunting Usia 6-12 bulan di Kabupaten Sumba Tengah Nusa Tenggara Timur, *Journal of Nutrition College*, 2017;6: 83-95.
6. Hanum F, Khomsan A, Heryanto Y. 2014. Hubungan Asupan Gizi Dan Tinggi Badan Ibu Dengan Status Gizi Anak Balita, *Jurnal Gizi dan Pangan*, Maret 2014;9(1): 1-6.
7. Depkes RI. 2014. Laporan Hasil Riset Kesehatan Dasar Indonesia Tahun 2014. Depkes, Jakarta.
8. Lestari MU, Lubis G, Pertiwi D. 2014. Hubungan Pemberian Makanan Pendamping ASI (MP-ASI) dengan Status Gizi Anak Usia 1-3 Tahun di Kota Padang Tahun 2012, *Jurnal Kesehatan Andalas*, vol. 3, no. 2, pp. 188-190.
9. Kemenkes RI. 2014. Pedoman Gizi Seimbang.
10. Adrian M, Kartika V. Pola Asuh Makan pada Balita dengan Status Gizi Kurang di Jawa Timur, Jawa Tengah dan Kalimantan Tengah. Buletin Penelitian Sistem Kesehatan. 2013.
11. Fajrina N. Naskah Publikasi Hubungan Faktor Ibu dengan Kejadian Stunting pada Balita di Puskesmas Piyungan Kabupaten Bantul. 2016. Universitas Aisyiyah Yogyakarta.
12. Putra O. Pengaruh BBLR Terhadap Kejadian Stunting pada Anak Usia 12-60 Bulan di Wilayah Kerja Puskesmas Pauh Tahun 2015. Padang: Fakultas Kesehatan Masyarakat Universitas Andalas. 2016.

13. Welasasih BD, Wirjatmadi B. 2012. Beberapa Faktor yang Berhubungan dengan Status Gizi Balita Stunting. Surabaya: Departemen Gizi Kesehatan Universitas Airlangga. 2015.
14. Rohmatun NY. Hubungan Tingkat Pendidikan Ibu dan Pemberian ASI Eksklusif dengan Kejadian Stunting pada Balita di Desa Sidowarno Kecamatan Wonosari Kabupaten Klaten. Universitas Muhamadiyah Surakarta. 2014.
15. Candra A. Hubungan Underlying Factors dengan Kejadian Stunting pada Anak 1 sampai 2 Tahun. Semarang (Indonesia). Universitas Diponegoro Semarang. 2013.

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Promoting non-communicable disease risks in rural area: a Community and Family Health Care - inter professional education (CFHC-IPE) activity

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ABSTRACT Health is an aspect that could be viewed from various age groups and factors. Risk factors found during Community and Family Health Care-Inter Professional Education visits in Pondok 2, Widodomartani, Ngemplak are the habits of people who still lacking in controlling excessive consumption of sugar, salt, and oily foods. These may lead to many problems such as hypertension, diabetes mellitus and hypercholesterolemia. Based on the problem, our group held the community service activities focusing on health screening, particularly on the measurement of blood pressure, random blood glucose, and total cholesterol level. This activity aims to screen the community health condition and to raise health awareness and understanding. Therefore, people may start to take action improving their lifestyle in order to maintain their long term health status. This research is a retrospective study using secondary data obtained from health examination records at the time of community service. The health check-up was conducted on May 4, 2019. We utilize mannual mercury sphygmomanometer for blood pressure measurement and automatic skin prick test device for random blood glucose and total cholesterol level. During the health examination, we also counsel the subjects about healthy lifestyle. Sixteen people from the targeted community attended the activity. Half of the people had normal blood pressure; 1 person pre-hypertension; 4 persons stage I hypertension, and 3 persons stage II hypertension. For random blood glucose measurement, only 1 resulted in high random blood glucose whilst others were within normal limit. Total cholesterol level was examined to 9 people with history of hypercholesterolemia with the following results; 2 people had high level, 2 people had borderline-high level ,and the rest had normal level. Most of the people within the community had good health status. This kind of activity can be routinely conducted not only to screen community health status but also to promote health awareness.

KEYWORDS community health, health awareness, health check-up

1. Introduction

Health problems in Indonesia are quite high untill now. Non-communicable diseases (NCDs) are one of the most common causes of death in Indonesia.[1] The death trend in Indonesia due to non-communicable diseases has increased from 37% in 1990 to 57% in 2015.[2] In low and middle-income countries, there are 15 million people who died from non-communicable diseases annually.[3] Based on Basic Health Survey (Riskesdas) 2018, the prevalence of non-communicable diseases

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has increased compared to the 2013 Riskesdas, including cancer, stroke, chronic kidney disease, diabetes mellitus, and hypertension.[4] Non-communicable diseases management consist of detection, screening, and treating disease. It can be used to reduce medical treatment costs and subsequent treatment.[5]

In this case, the area that became the object of our destination was Pondok 2 village, Widodomartani, Ngemplak. We held several events, namely free health checks, which consist of checking blood sugar, cholesterol, and blood pressure. Based on the previous assessment, we found that most of the residents rarely check their health status, especially blood sugar, cholesterol, and blood pressure.

We aimed that by conducting this activity can be a forum to facilitate the community in the health sector. Free health examination for adults and elderly will increase their awareness of their health and the risks of non-communicable diseases in Pondok 2 village such as high blood pressure, hypercholesterolemia and gout. Then, people will become aware to control routinely based on the results of the examination that carried out at the event. Overall, this activity aims to improve the welfare of the people in Pondok 2 village from the health sector by increasing awareness and knowledge to prevent non-communicable diseases.

2. Methods

The method used in our program was to conduct a health check which consist of blood pressure, blood sugar, and direct cholesterol and also conduct discussions when there are questions from the residents. This manuscript is written based on secondary data from community health program.

2.1 Sample selection

The study used purposive sampling and recruited 16 participants from 10 (ten) householders who have been determined by the Community and Family Health Care-Inter Professional Education (CFHC-IPE) Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada. The participants were invited to attend the community service event. A purposive sample is where a researcher selects the sample based on the purpose of the sample.[6] Inclusion criteria included: the resident of Pondok 2, Widodomartani, Ngemplak, Sleman; adult or elderly; able to communicate, and have the willingness to participate in health examinations. Meanwhile, the residents who were not in the place when the health examination was held were excluded.

2.2 Location, time and duration of activities

The activity was held on Saturday, May 4th 2019 at the pavilion of one of the residents of RT 06 Pondok 2, Widodomartani, Ngemplak, Sleman. The duration for a health examination is for 60 minutes that was at 11.00-12.00 a.m.

2.3 Data collection techniques and data analysis techniques

The data were obtained from the result of CFHC-IPE health examination then we did the categorized. Blood pressure is classified into 5 categories: normal less than 120/80 mmHg, prehypertension with systole 120-129 mmHg and diastole less than 80 mmHg, stage I hypertension with systole 130-139 mmHg and diastole 80-89 mmHg, stage II hypertension with systole more than 140 mmHg and diastole more than 90 mmHg.5 Blood sugar levels are classified as normal, prediabetes, and diabetes.6 Cholesterol levels are divided into 5 categories, which are normal if less than 100 mg/dL, are at risk of having heart disease if 100-129 mg/dL, borderline high if cholesterol levels are 130-159 mg/dL, high 160-189 mg/dL, and very high if more than equal to 190 mg/Dl.7

3. Results

The community was very enthusiastic about taking part in this activity (Figure 1). Based on the results of the examination on the Table 1, it can be seen that in terms of blood pressure 16 people were present

at the health examination held, 8 of 16 people had normal blood pressure (≤120/80 mmHg), 1 person had slightly elevated blood pressure or called prehypertension (systole 121-129 mmHg), 4 people had stage I hypertension (systole 130-139 mmHg or diastole 80-89 mmHg), and 3 people had stage II hypertension (systole ≥ 140 mmHg or diastole ≥ 90 mmHg).

At the health examination, blood sugar levels were checked for everyone and cholesterol level was for control for people who had a history of hypercholesterolemia. On blood sugar examination using a random blood glucose test method so that health examination participants do not need to fast the night before, in the table 1, it can be seen that 14 out of 16 people have normal blood sugar levels (<200 mg/dL) and there is 1 participant who has blood sugar of 402 mg/dL so that it falls into the category of diabetes (≥ 200 mg/dL) and there is one person who refuses to examine blood sugar and cholesterol. For cholesterol checks we performed total blood cholesterol levels to 9 people who had a history of hypercholesterolemia and found that 5 out of 9 people who had a history of hypercholesterolemia had good and controlled total blood cholesterol levels (<200 mg/dL) while 4 out of 9 people still having high cholesterol levels and even 2 of them fall into the category of high total cholesterol levels (40240 m / dL) and the other 2 fall into borderline high (200-239 mg / dL).

Table 1. Result of health examination Rt 06 Pondok 2, Widodomartani, Ngemplak, Sleman

No	Random blood Glucose (mg/dl)	Cholesterol (mg/dl)	Blood pressure (mmHg)
1.	83	179	110/60
2.	79	257	130/70
3.	88	224	130/80
4.	83	186	90/60
5.	90	234	130/78
6.	96	-	118/80
7.	133	185	140/90
8.	125	-	120/80
9.	84	-	140/90
10.	78	-	110/70
11.	402 (Keton)	250	120/90
12.	135	192	140/90
13.	92	-	100/70
14.	76	172	110/70
15.	100	-	130/70
16.	-	-	125/80

4. Discussion

Based on the results, the health screening program that aims to control public health while simultaneously educating the public about the importance of controlling blood sugar, cholesterol, and blood pressure regularly went well. The health examination participants were enthusiast in asking questions and wanting to know more about health. New information such as the case of high blood pressure, high blood sugar levels, and high cholesterol levels from some participants were obtained. Most of the problems happens to the participants who rarely carried out periodic examinations to the Primary Health Center (puskesmas).

Blood sugar, cholesterol, and blood pressure are some indicators of the risk factors that can trigger non-communicable diseases such as stroke or cardiovascular disease (CVD).[10,11,12] It is essential to conduct periodic checks and reduces for groups that have history of high blood sugar and high cholesterol include high blood pressure both in the past and in the family to prevent the possibility of non-communicable disease as mentioned above.[13] The impact of the health examinations is increasing awareness regarding the importance of maintaining personal health through a lifestyle and the importance of doing regular health at the primary health center.[14,15] Some participants who got higher than normal results were suggested to visit the nearby primary health center.

Figure 1. The atmosphere when community service activities are carried out

5. Conclusion

Based on the data listed above, we conclude that the level of achievement of our service activities has not been fully fulfilled considering there are still some people who cannot attend health checks for certain reasons. The method used is quite simple and good in accordance with the needs of the community in the area as their daily activities so that a practical matter will greatly help attract their interest in taking a health check.

Our suggestions for further community service activities may be able to further broaden the focus of the target community such as adolescents and children. It should also be considered so that it does not only conduct community service targeting parents and the elderly but also targets the health of young adolescents and children.

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Conflict of Interests

The author(s) declared no potential conflict of interest with respect to the research, authorship, and/or publication of this article.

References

1. Kementerian Kesehatan Republik Indonesia. Penyakit Tidak Menular(PTM) Penyebab Kematian Terbanyak di Indonesia [Internet]. Jakarta: Kementerian Kesehatan Republik Indonesia; 2011 [updated 2011 Agustus 18; cited 2019 July 5]. Available from: http://www.depkes.go.id/article/print/1637/penyakit-tidak-menular-ptm-penyebab-kematian-terbanyak-di-indonesia.html
2. Kementerian Kesehatan Republik Indonesia. Asosiasi Pemerintah Kabupaten Seluruh Indonesia Bersepakat untuk Cegah dan Kendalikan Penyakit Tidak Menular [Internet]. Jakarta: Kementerian Kesehatan Republik Indonesia; 2016 [updated 2016 August 8; cited 2019 July 5]. Available from: http://www.depkes.go.id/article/print/16080900002/asosiasi-pemerintah-kabupaten-seluruh-indonesia-bersepakat-untuk-cegah-dan-kendalikan-penyakit-tidak.html
3. Garwood, P and Jasarevi, T. 2018. Worls leaders join new drive to beat noncommunicable diseases. Pan American Health Organization.
4. World Health Organization. Noncommunicable Diseases [Internet]. 2018 [updated 2018 June 1; cited 2019 July 5] Available from : https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases
5. Lembaga Penelitian dan Pengembangan Kesehatan (Litbangkes). 2018. Laporan Hasil Riset Kesehatan Dasar (Riskesdas) Tahun 2018. Kementerian Kesehatan Republik Indonesia.
6. Stephanie. Purposive sampling (Deliberate

Sampling). Statistic how to [Internet]. 2015 [updated 2015 May; cited 2019 July 5]. Available in https://www.statisticshowto.datasciencecentral.com/purposive-sampling/

7. American College of Cardiology. New ACC/AHA High Blood Pressure Guidelines Lower Definition of Hypertension [Internet]. ACC Foundation[US] News Story; 2017 [Updated 2017 November 13; cited 2019 July 5] Available from: https://www.acc.org/latest-in-cardiology/articles/2017/11/08/11/47/mon-5pm-bp-guideline-aha-2017
8. The Global Diabetes Community. Blood Sugar Level Ranges [Internet]. Diabetes.co.uk; 2019 [cited 2019 July 5] Available from: https://www.diabetes.co.uk/diabetes_care/blood-sugar-level-ranges.html
9. Fletcher, Jenna. What Should My Cholesterol Level be at My Age. [Internet]. Medical News Today. [Updated 2017 February 20; cited 2019 July 5] Available from: https://www.medicalnewstoday.com/articles/315900.php
10. NIDDK. 2017. Diabetes, Heart Disease, and Stroke. National Institute of Diabetes and Digestive, and Kidney Disease.Availabe in https://www.niddk.nih.gov/health-information/diabetes/overview/preventing-problems/heart-disease-stroke
11. Sacks FM, et al. Dietary Fats and Cardiovaskular Disease : A Presidential Advisory From the American Heart Association. AHA Journal. 2017; 136(3):e1-e23.
12. Banach M, et al. Association of systolic blood pressure levels with cardiovascular events and all-cause mortality among older adults taking antihypertensive medication. Int J Cardiol. 2014; 176(1): 219-26.
13. Ettehad D, Emdin CA, Kiran A., Anderson SG, et al. Blood pressure lowering for prevention of cardiovascular disease and death: a systematic review and meta-analysis. Lancet. 2016 Mar 5; 387(10022):957-967.
14. Murad MA, et al. Assessment of the Common Risk Factors Associated with Type 2 Diabetes Mellitus in Jeddah. Int J Endocrinol. 2014;2014:616145.
15. Kementrian Kesehatan Republik Indonesia. 2018. Ketahui Tekanan Darahmu Cegah Hipertensi (*The Silent Killer*). Available in http://p2ptm.kemkes.go.id/kegiatan-p2ptm/pusat-/ketahui-tekanan-darahmu-cegah-hipertensi-the-silent-killer

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Implementation of interprofessional education in community setting

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ABSTRACT Community health problem(s) needs to be solved collaboratively among the health care team. Interprofessional Education (IPE) is implemented to facilitate health students to collaborate before they join in the working world. The purpose of this study was to identify the experience of students, lecturers, and family members in the implementation of IPE in a community setting. All (465) sixth semester medical, nursing, and nutrition students in the Faculty of Medicine Universitas Diponegoro participated in the IPE program. Each small group contains 4-5 students who worked together in the community setting to identify family health problems, implement interventions, and evaluate the results. Focus Group Discussion (FGD) was conducted to evaluate the implementation. Twenty-four medical, nursing, and nutrition students, eight lecturers, and five family members were involved in this study. FGD was conducted separately among groups. The implementation is divided into four phases, namely, preparation, process, evaluation, and benefit. Unclear competencies and roles-responsibilities of each student in the program was the most problem faced during preparation, while obstacles during the process were difficult to set a schedule among team members. Conducting an objective assessment of both methods and tools needs to be concerned in the evaluation phase. However, students, lecturers, and family members appreciated the program and preferred to sustain the program. IPE can be implemented in a community setting to solve health problems and it can facilitate students to collaborate in a team, but it needs to be settled including preparation, process, and evaluation.

KEYWORDS community setting; implementation; interprofessional education

1. Introduction

Health care service is required to provide professional and quality services to patients since these patients have increased knowledge and the need for comfort when receiving the service. For that, the responsibility of providing quality health care services does not rely on a particular health profession. Instead, all health professions should be involved. Collaboration and cooperation among the health professionals both in community and clinical settings become essential. Collaboration is an interprofessional process which includes more than one profession to complete one task or to achieve an objective[1]. Furthermore, collaboration is an effective interprofessional process to accomplish an objective in which it cannot be achieved if each profession works alone.[1] Collaboration between the physicians and nurses is essential to optimize the services given to patients.[2]

Interprofessional Education (IPE) is one form of collaboration which can be practiced by students

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in the delivery of health care services.[3, 4, 5] IPE can be defined as a learning process in which students from various health disciplines collaborate to provide health care services to patients, and the goal is to increase the quality of care.[6] IPE needs to be introduced to the students as early as possible to facilitate them to work in teams and collaborate with other students from different disciplines. Collaborating and working in teams should be introduced to the students in the academic phase before they have an internship in both clinical and community settings.[7] WHO explained that collaboration in IPE would help the community to access the health care service[8]. Previous studies reported that communication and collaboration skills increased, and also they were satisfied with their collaborative practice by participating in the community-based interprofessional education programs.[9-12]

The Faculty of Medicine, Universitas Diponegoro, as one of the health education institutions in Central Java, has taken the responsibility to help the local government to increase maternal health by implementing the IPE program in the community. This program has recently been implemented in collaboration with the health district and primary health center. The IPE program is applied when two or more students from different disciplines learn from each other to improve the collaboration to provide quality services. Within this program, the students from several health professions work together to gain experience on how to deal with the health problems in the community (known as community-based education/CBE). Previous study reported that active community participation in the CBE program increases the community's compliance with the student's interventions.[13] It is expected that an appropriate combination of the IPE –CBE programs will provide an added value of CBE.

The program involves three study programs in the Faculty of Medicine of Universitas Diponegoro, namely medicine, nursing, and nutrition. The family approach was chosen for the implementation of this program. The family recruited for the program would be supervised by a group of students, consisting of three or four students from different disciplines. The team would conduct an assessment to gain the data, identify and determine the health problem(s), plan the intervention based on the problem(s), implement the plan, and evaluate the implementation. During the process, the students were supervised by a lecturer.

This study aimed to identify the experience of students, lecturers, and community in the implementation of the IPE programs in community settings. The result will be necessary for the institution, Faculty of Medicine of Universitas Diponegoro, to improve its implementation and to increase the quality of the program.

2. Method

The study used a qualitative method. Focus Group Discussion was conducted to collect data. Twenty-four medical, nursing, and nutrition students, eight lecturers, and five family members were involved in this study. FGD was conducted separately among groups. It facilitated participants to share their ideas and suggestions without pressure. FGD was led by one facilitator, used guidance, and was recorded using both audio and visual aid. Furthermore, the result was analyzed qualitatively. It was identified as keywords and themes.

3. Result

There were four themes derived from the result, namely preparation, process, evaluation, and benefit of the program. Each theme consisted of several categories. Table 1 described the result.

4. Discussion

This part is going to discuss the result. The first theme is preparation. There are five categories, namely team building, integrated subject, roles and responsibilities, module or guidance book, and facilitator during preparation. Some participants stated that team building was less useful because it was held too short and too late. They suggested to conduct team building at least six months before and to introduce the IPE program to students

Table 1. Themes, categories, and keywords

Themes	Categories	Keywords
Preparation	Team building	Time for team building is too short
		Team building starts from one or two semesters before
	Integrated subject	Must be separated from other subjects
		Too many assignments plus other subjects
	Roles and responsibilities	Unclear roles and responsibilities each profession
		Roles of nursing and medical students are quite the same
		The competencies of IPE are not clear. Students work together to solve health problems or work base on their subject?
	Module or guidance book	Competencies must be clear whether team working and collaborating or giving intervention to the family
		Modul is clear enough, too many assessment forms
		Less guidance for nutrition students
	Facilitator	Not all facilitators understand about the program
Process	Scheduling	Difficult to time scheduling in a group
		Difficult to match time with family
	Interaction with family	Focus intervention is on nutrition problem
		Students are difficult to identify the family's health problems
	Supervision	Communication between students and facilitators can be held using the phone or social media
		Not all facilitators come to the family
		Facilitators do not work together
Evaluation	Method	Method (seminar using poster) is suitable
		Scoring is not transparent and late
	Tools	The assessment form is not clear
Benefits	Teamworking	Students learn to work in a team with other health students
	Communication	Helping to train communication skill with other health students
		Helping to improve communication with the community
	Objectives	Good and prefer to sustain
		Help the community to solve health problems
		Solve health problems comprehensively
	Collaboration	Helping to train collaboration skill in a group

involved. The IPE program can be conducted in four levels, namely level 1 interprofessional education: the foundation of group skills; level 2 introduction to interprofessional education and interprofessional collaboration: exposure to the health care team; level 3 interprofessional collaboration; and level 4 becoming an effective member of the health care team[14]. It means that IPE needs to be implemented step by step before students work in a team to deliver health care.

The second category is an integrated subject. It is stated that IPE is an approach to the learning process, so it will be better to integrate it with other subjects. However, participants mentioned that the IPE program must be separated from other subjects because it is too many assignments to be finished. Integrated subjects in IPE implementation is a designing curriculum, which is an important preparation of the program, and it is the responsibility of Faculty members.[15] Furthermore, participants also focused on roles and responsibilities. They thought that the roles and responsibilities of each profession were unclear and there was a similarity between nursing and medical students' roles. On the one hand, students' readiness to work in inter-professional will increase as long as their roles and responsibilities are clear.[16] They also confused about the focus of competencies, whether to collaborate with other health students or solve families' health problems. Understanding roles and responsibilities are part of IPE competencies according to Inter-professional Education Collaborative (IPEC) besides Values/Ethics for Interprofessional Practice, Interprofessional Communication, and Teams and Teamwork.[17] Students are pursued to understand their profession's roles and responsibilities and share it with others. Students' self-assessment has a positive effect on inter-professional competencies.[18]

Another category is module or guidance book. The module can be used as guidance, but too many assessment forms, while nutrition students felt that their guidance is less. A composing module or guidance book is a part of designing a curriculum that is part of 10 barriers of IPE implementation.[19] The module must be generic composed to used as guidance. The last category is the facilitator. The participants stated that not all facilitators understand the program, so it affected the way they supervised the students. It is stated that one of the barriers to implementing the IPE program in a developing country is resource limitation, namely lecturers or facilitators. The same perception of IPE among facilitators is important. It will support successful program implementation.[20]

The second theme processes. During the process, the participants struggled with time scheduling both in a group and in a family. They stated that it was difficult to match the time among group members and to match the time with the family. Arranging schedule is part of communication and teamwork, which are competencies of IPE, according to IPEC.[17] A good schedule in a group shows that students can communicate and work in a team.

Furthermore, the participants complained about the supervision process. Even though communication between students and facilitators can be held by using the telephone or social media, the participants stated that not all facilitators came to the field together with the students. Facilitators did not give an example of collaboration because they supervised individually. The supervision process is a teaching process. It is part of 10 barriers that need to be concerned in implementing the IPE program. Most developing countries face this problem.[19] It must be well planned in curriculum design, which is the responsibility of Faculty members.[15]

The third theme is evaluation. The participants stated that the assessment method, namely the seminar using the poster as a media, was suitable. However, it needs revising in the form and the scoring must be clearer. Seminar was conducted three times. The first seminar was to identify need assessment, define health problems, compose planning of intervention. The second assessment was to present the implementation of intervention and result, while the last seminar was to share evaluation and planning for further intervention.

Students will get feedback in every seminar to improve their performance in the next seminar. The assessment implemented is part of the formative assessment. It is suitable for the IPE program because formative assessment will help students to improve their performance.[20]

Furthermore, knowledge, transferable skills, professionalism, and attitudes are important elements for assessment which is assessed during seminar[21]. Composing a clear form and score are suggestions to improve the program. It is part of defining assessment instruments in assessment processes besides formulating questions, setting the assessment processes, defining assessment instruments, analyzing the result, and disseminating the choices.[22]

The last theme is the benefit of the program. It was stated that the program will increase communication skills both in a group and with a family. It is stated that IPE facilitates the students to improve interprofessional communication skills.[23] After the implementation of IPE, students gained a strong confidence in communication with other professions.[24] Furthermore, the participants stated that collaboration skill will increase by implementing the program. IPE is very effective and helpful to improve teamwork because IPE provides a chance for students to work together to deliver health care.[25] The same idea stated that IPE can facilitate students to gain unique experiences related to collaboration, coordination, patient management, holistic intervention, and services.[26] IPE also helps the health profession to improve skills, knowledge, and attitudes into collaboration.[27] An increased knowledge of importance with teamwork and collaboration, learning professional roles, and respecting other professional points of view are focusing on IPE implementation.[24] IPE increased the quality of care by improving the behavior of the health care team in conducting collaboration.[28] The participants stated that the objectives of the program were good; they appreciated the program and prefer to sustain the program. It helps students to solve families' health problems and to solve health problems comprehensively. Furthermore, IPE is also the potential to impact patient care by working together.[29] Students' awareness of social health problems improves as well as by finishing assignment tasks in IPE program[30]. Subsequently, community capacity is affected by the students acting as a catalyst by implementing IPE in community-based service-learning programs.[31]

The study is discussed about the experience of students and facilitators in implementing IPE in the community setting. It will help other institutions to get the lesson learned about its implementation, including preparation, process, evaluation, and benefit. Furthermore, it is suggested to conduct further research in the quantitative method to get more data about implementation.

5. Conclusion

IPE program is preferable to be implemented in a community setting. It facilitates students to learn in teamwork and solve families' health problems collaboratively. However, it needs improvement both in preparation, process, and evaluation.

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Conflict of interests

The study will give experience for institutions that are going to implement IPE in the community setting.

References

1. Bronstein, Laura R. A model for interdisciplinary collaboration. *Social Work*. 2003;48(3):297-306.
2. Liaw SY, Zhou WT, Lau TC, Siau C, Chan SW. An interprofessional communication training using simulation to enhance safe care for a deteriorating patient. *Nurse Education Today*. 2014 1;34(2):259-64.
3. McPherson K, Headrick L, Moss F. Working and learning together: good quality care depends

on it, but how can we achieve it?. *BMJ Quality & Safety*. 2001;10(suppl 2):ii46-53.

4. Horder J. Interprofessional collaboration and interprofessional education. *The British Journal of General Practice.* 2004;54(501):243.
5. Perkin K. Nurse practitioners and interprofessional collaboration. *Journal of interprofessional care.* 2011;25(4):243.
6. Buring SM, Bhushan A, Broeseker A, Conway S, Duncan-Hewitt W, Hansen L, Westberg S. Interprofessional education: definitions, student competencies, and guidelines for implementation. *American Journal of Pharmaceutical Education*. 2009; 73 (4).
7. Curran VR, Sharpe D, Forristall J. Attitudes of health sciences faculty members towards interprofessional teamwork and education. *Medical education*. 2007;41(9):892-6.
8. World Health Organization. Framework for Action on Interprofessional Education & Collaborative Practice. Geneva; Health Professions Network Nursing and Midwifery Office within the Department of Human Resources for Health; 2010. Available on: http://www.who.int/hrh/nursing_midwifery/en/
9. Salam A. Community and Family Case Study: a community-based educational strategy to promote Five Star Doctors for the 21st century. *SouthEast Asian Journal of Medical Education*. 2009;3(1):20-4.
10. Giordano C, Arenson C, Lyons KJ, Collins L, Umland E, Smith K, et al. Effect of the health mentors program on student attitudes toward team care. *Journal of allied health.* 2013;42(2):120-4.
11. De Los Santos M, McFarlin CD, Martin L. Inter-professional education and service-learning: a model for the future of health professions education. *Journal of Inter-professional Care*. 2014; 28(4): 374–375.
12. Asakawa T, Kawabata H, Kisa K, Terashita T, Murakami M, Otaki J. Establishing community-based integrated care for elderly patients through interprofessional teamwork: A qualitative analysis. *Journal of Multidisciplinary Healthcare*. 2017; 10: 399–407.
13. Kristina TN, Majoor GD, Van Der Vleuten CP. Comparison of outcomes of a community-based education program executed with and without active community involvement. *Medical education*. 2006;40(8):798-806.
14. Salfi J, Solomon P, Allen D, Mohaupt J, Patterson C. Overcoming all obstacles: a framework for embedding interprofessional education into a large, multisite Bachelor of Science Nursing program. *Journal of Nursing Education*. 2012 Feb 1;51(2):106-10.
15. Kahaleh AA, Danielson J, Franson KL, Nuffer WA, Umland EM. An interprofessional education panel on development, implementation, and assessment strategies. *American Journal of Pharmaceutical Education*. 2015 Aug 25;79(6):78.
16. Soubra L, Badr SBY, Zahran EM, Aboul-Seoud M. Effect of Interprofessional Education on Role Clarification and Patient Care Planning by Health Professions Students. Health Professions Education. *Health Professions Education*. 2017; 4(4): 317-328.
17. Soubra L, Badr SB, Zahran EM, Aboul-Seoud M. Effect of Interprofessional Education on Role Clarification and Patient Care Planning by Health Professions Students. *Health Professions Education*. 2018;4(4):317-28.
18. Sevin AM, Hale KM, Brown NV, McAuley JW. Assessing interprofessional education collaborative competencies in service-learning course. *American journal of pharmaceutical education*. 2016;80(2):32.
19. Sunguya BF, Hinthong W, Jimba M, Yasuoka J. Interprofessional education for whom?—challenges and lessons learned from its implementation in developed countries and their application to developing countries: a systematic review. *PloS one*. 2014;9(5):e96724.
20. Anderson ES, Kinnair D. Integrating the assessment of interprofessional education into the health care curriculum. Journal of Taibah University Medical Sciences. 2016;11(6):552-8.

21. Mpofu R, Imalingat A. The development of an instrument for assessing community-based education of undergraduate students of community and health sciences at the University of the Western Cape. *Education for Health*. 2006;19(2):166-78.
22. Reeves S, Barr H. Twelve steps to evaluating interprofessional education. *Journal of Taibah University Medical Sciences.* 2016;11(6):601-5.
23. Kirwin J, Greenwood KC, Rico J, Nalliah R, DiVall M. Interprofessional curbside consults to develop team communication and improve student achievement of learning outcomes. *American journal of pharmaceutical education*. 2017;81(1):15.
24. Carr S. Examining health professional students' attitudes on interprofessional education. Open Access Dissertations. Paper 309. University of Rhode Island; 2015. Available from: http://digitalcommons.uri.edu/oa_diss/309
25. Wagner J, Liston B, Miller J. Developing interprofessional communication skills. *Teaching and learning in nursing*. 2011;6(3):97-101.
26. Opina-Tan LA. A pilot implementation of interprofessional education in a community-academe partnership in the Philippines. *Education for Health*. 2013;26(3):164.
27. Claramita, M. Communication and Interprofessional Teamwork. Buku Panduan Umum CFHC-IPE. Yogyakarta: Fakultas Kedokteran Universitas Gajah Mada;2014.
28. Riskiyana R, Claramita M, Rahayu GR. Objectively measured interprofessional education outcome and factors that enhance program effectiveness: a systematic review. *Nurse education today*. 2018;66:73-8.
29. Posey S, Brady J, Pate K, Smith J, Peveto S. Description and assessment of a pilot interprofessional education case competition activity. *Currents in Pharmacy Teaching and Learning*. 2018;10(4):505-10.
30. Gallagher P, Pullon S, Skinner M, McHugh P, McKinlay E, Gray L. An interprofessional community education project as a socially accountable assessment. *Journal of Interprofessional care*. 2015;29(5):509-11.
31. Martens, H., & Lairamore, C. The role of student adaptability in interprofessional education. *Journal of Interprofessional Education & Practice*. 2016;5:45–51