

APPENDICES

Appendix 1: Application of Data from the NHMS Report: Vol. II 2015



UNIVERSITI SAINS ISLAM MALAYSIA
جامعة العلوم الإسلامية الماليزية
ISLAMIC SCIENCE UNIVERSITY OF MALAYSIA

Fakulti Perubatan dan Sains Kesihatan
Universiti Sains Islam Malaysia

2 April 2019 (1)
USIM/BANKRAKYAT_K1/FPSK/052002/42117

YBhg. Datuk Dr Noor Hisham bin Abdullah
Ketua Pengarah Kesihatan
Kementerian Kesihatan Malaysia
Aras 12, Blok E7, Kompleks E
Pusat Pentadbiran Kerajaan Persekutuan
62590 Putrajaya

Assalamualaikum dan Salam Sejahtera

Yang Bhg. Datuk Dr.,

**PERMOHONAN DATA DARIPADA LAPORAN NATIONAL HEALTH MORBIDITY SURVEY (NHMS):
VOLUME II 2015**

Dengan hormatnya sukacita saya merujuk kepada perkara di atas.

2. Sebagai makluman pihak YBhg Datuk Dr, bahawa saya mewakili sekumpulan para penyelidik daripada Fakulti Perubatan dan Sains Kesihatan, Universiti Sains Islam Malaysia (USIM) ingin memohon data daripada laporan National Health Morbidity Survey: Vol. II 2015 yang diterbitkan oleh Institut Kesihatan Umum seperti yang berikut:

- a) Prevalens diabetes, hipertensi dan hypercholesterolemia bagi ethnic Orang Asli Semenanjung
- b) Prevalens faktor risiko NCD seperti merokok, tidak aktif fizikal, amalan pemakanan yang tidak sihat dan penggunaan alkohol bagi ethnic Orang Asli Semenanjung

3. Adalah dimaklumkan bahawa kajian kumpulan penyelidik kami ini telah mendapat kebenaran daripada Jawatankuasa Etika & Penyelidikan Perubatan dengan surat rujukan KKM/NIHSEC/P18-2338 (11) bertarikh 20 Februari (seperti dilampiran A).

4. Tujuan permohonan data ini bagi tujuan ulasan literatur dan perbandingan data dengan data yang akan dikumpulkan dalam kajian ini.

5. Kami amat berbesar hati sekiranya pihak YBhd Datuk Dr. dapat mempertimbangkan seterusnya meluluskan permohonan ini. Bersama-sama ini juga saya sertakan nombor telefon dan email saya dan juga pembantu penyelidik kajian ini Ph. Muslimah binti Ithnin (019-334 8722) untuk dihubungi bagi maklumbalas mengenai permohonan ini.

Kerjasama daripada pihak Tuan kami dahului dengan ribuan terima kasih.

Sekian, wassalam

Berimu, Berdisiplin dan Bertakwa | Knowledgeable, Disciplined and Devout



CERTIFIED TO ISO 9001:2008
CERT. NO.: AR 3454

Universiti Sains Islam Malaysia, Bandar Baru Nilai 71800, Negeri Sembilan Darul Khusus, Malaysia
Tel : (+6)06 - 798 8000
Faks : (+6)06 - 798 8204
www.usim.edu.my

2 April 2019 (2)

“BERILMU, BERDISIPLIN DAN BERTAKWA”

Saya yang menjalankan amanah,



PROF. MADYA DR. MOHD DZULKHAIRI BIN MOHD RANI
Ketua Penyelidik
Geran USIM/BANKRAKYAT_K1/FPSK/052002/42117
Fakulti Perubatan dan Sains Kesihatan
Universiti Sains Islam Malaysia (USIM)
Tel : +603 4289 2400
Email : drdzulkhairi@usim.edu.my

PN. MUSLIMAH BINTI ITHNIN
Pembantu Penyelidik
Geran USIM/BANKRAKYAT_K1/FPSK/052002/42117
Fakulti Perubatan dan Sains Kesihatan
Universiti Sains Islam Malaysia (USIM)
Tel : 019-334 8722
Email : mus_miema@yahoo.com

Appendix 2: Search Strategy for Behavioural Risk Factors of NCDs

Search strategy used on PubMed® 26 March 2019

Search (((((((nutrition[Title/Abstract] OR diet[Title/Abstract] OR nutrition assessment[Title/Abstract] OR nutrition surveys[Title/Abstract])) OR (exercise*[Title/Abstract] OR physical inactivity[Title/Abstract] OR physical activity[Title/Abstract] OR motor activity[Title/Abstract] OR sports[Title/Abstract])) OR (smoking[Title/Abstract] OR smoking cessation[Title/Abstract] OR smoke inhalation injury[Title/Abstract] OR tobacco smokeless[Title/Abstract] OR tobacco use cessation[Title/Abstract] OR tobacco use disorder[Title/Abstract] OR tobacco[Title/Abstract] OR nicotine[Title/Abstract] OR nicotine dependence[Title/Abstract] OR tobacco dependence[Title/Abstract] OR smoking dependence[Title/Abstract] OR cigarette[Title/Abstract])) OR (ethanol[Title/Abstract] OR alcoholism[Title/Abstract] OR alcoholic beverages[Title/Abstract] OR alcohol-related disorders[Title/Abstract] OR alcohol drinking[Title/Abstract]))) AND (((Orang Asli[Title/Abstract] OR indigenous*[Title/Abstract] OR aboriginal*[Title/Abstract] OR native[Title/Abstract])) OR (proto-malay[Title/Abstract] OR negrito[Title/Abstract] OR senoi[Title/Abstract])) AND malaysia Filters: Full text; Publication date to 2018/12/31

Appendix 3: Search Strategy for Metabolic Risk Factors of NCDs

Search strategy used on PubMed® 13 September 2019


Search ((metabolic syndrome[Title/Abstract] OR syndrome X[Title/Abstract]) OR metabolic syndrome X[Title/Abstract])

AND (((Orang Asli[Title/Abstract] OR indigenous*[Title/Abstract] OR aboriginal*[Title/Abstract] OR native[Title/Abstract])) OR (proto-malay[Title/Abstract] OR negrito[Title/Abstract] OR senoi[Title/Abstract]))

AND malaysia



Appendix 4: Approval Letter Conducting Research at FPSK, USIM

 **UNIVERSITI SAINS ISLAM MALAYSIA**
جامعة العلوم الإسلامية الماليزية
ISLAMIC SCIENCE UNIVERSITY OF MALAYSIA

Jawatankuasa Penyelidikan FPSK USIM / E.12/244 (124)
8 Rabiulakhir 1439H / 27 Disember 2017

PROFESOR MADYA DR. MOHD DZULKHAIRI BIN MOHD RANI
Profesor Madya Perubatan
Fakulti Perubatan Dan Sains Kesihatan

Y. Bhg. Prof./Dr./Tuan/Puan,

Kelulusan Menjalankan Penyelidikan di FPSK, USIM

Tajuk : *'Prevalence, knowledge, attitude and practise on non-communicable diseases (NCDs) and general health-seeking behaviour amongst adults Resident in Negeri Sembilan'*

Kod Projek : USIM /REC/FPSK-0817-35

Dengan segala hormatnya, merujuk kepada perkara di atas.

2. Sukacita dimaklumkan bahawa, Jawatankuasa Penyelidikan FPSK bertarikh pada 27 Disember 2017 meluluskan penyelidikan Y. Bhg. Prof./Dr./Tuan/Puan bagi tajuk di atas seperti maklumat berikut

- i. Tempoh kajian diluluskan : 1 September 2017 hingga 31 Ogos 2019
- ii. Peruntukan : RM 40,000 daripada Bank Rakyat

3. Penyelidik perlu mengemukakan **Laporan Kemajuan Setiap 6 Bulan dan Laporan Akhir** sebaik sahaja penyelidikan tamat kepada **Pengerusi Jawatankuasa Penyelidikan FPSK (JKPFPSK)**.

Sekian, terima kasih.


"BERILMU, BERDISIPLIN DAN BERTAKWA"

Yang benar,

Nor Azila
(DR. NOR AZILA BINTI NOH)
Pengerusi
Jawatankuasa Penyelidikan FPSK (JKPFPSK)
Universiti Sains Islam Malaysia (USIM)

s.k. - Timbalan Dekan Penyelidikan & Inovasi
Fakulti Perubatan dan Sains Kesihatan
Fakulti JKP

Berilmu, Berdisiplin dan Bertakwa | Knowledgeable, Disciplined and Devout

 Universiti Sains Islam Malaysia, Bandar Baru Nilai 71800, Negeri Sembilan Darul Khusus, Malaysia
Tel : (+6)06 - 798 8000 Faks : (+6)06 - 798 8204 www.usim.edu.my



JAWATANKUASA ETIKA & PENYELIDIKAN PERUBATAN
(Medical Research & Ethics Committee)
KEMENTERIAN KESIHATAN MALAYSIA
D/a Kompleks Institut Kesihatan Negara (NIH)
Blok A, No.1 Jalan Setia Murni U13/52
Seksyen U13 Bandar Setia Alam,
40170 Shah Alam, Selangor.



Tel.: 03-33628888/ 8100/ 8205

Ruj.Kami: KKM/NIHSEC/P18-2338(11)
Tarikh: 20-Februari-2019

DR MOHD DZUKHAIRI MOHD RANI
UNIVERSITI SAINS ISLAM MALAYSIA (USIM) - PANDAN INDAH

Dato'/ Dr/ Tuan/ Puan,

SURAT KELULUSAN ETIKA:

NMRR-18-3111-44674 (IIR)
PREVALENCE, KNOWLEDGE, ATTITUDE AND PRACTICE ON NON-COMMUNICABLE DISEASES (NCDS) AND HEALTH DETERMINANTS AMONG ADULTS ORANG ASLI IN JELEBU, NEGERI SEMBILAN

Dengan hormatnya perkara di atas adalah dirujuk.

2. Bersama dengan surat ini dilampirkan surat kelulusan saintifik dan etika bagi projek ini. Segala rekod dan data subjek adalah SULIT dan hanya digunakan untuk tujuan kajian dan semua isu serta prosedur mengenai *data confidentiality* mesti dipatuhi. Kebenaran daripada Pengarah Hospital / Institusi di mana kajian akan dijalankan mesti diperolehi terlebih dahulu sebelum kajian dijalankan. Dato'/ Tuan/ Puan perlu akur dan mematuhi keputusan tersebut dan undang-undang lain yang berkaitan termasuk Akta Akses kepada Sumber Biologi dan Perkongsian Faedah 2017.

3. Penyelidik- penyelidik yang terlibat ialah:

Pejabat Kesihatan Daerah Jelebu

Dr Mohd Dzukhairi Mohd Rani (Penyelidik Utama)
Dr Nadeeya 'Ayn Umaisara Bt Mohamad Nor
Dr Nadia Mohd Effendy
Norsham Juliana Binti Nordin
Muslimah Binti Ithnin

4. Adalah dimaklumkan bahawa kelulusan ini adalah sah sehingga **19-Februari-2020**. Tuan/Puan perlu menghantar dokumen-dokumen seperti berikut selepas mendapat kelulusan etika. Borang-borang berkaitan boleh dimuat turun daripada laman web Jawatankuasa Etika & Penyelidikan Perubatan (JEPP) (<http://www.nih.gov.my/mrec>).

- i. **Continuing Review Form** selewat-lewatnya dalam tempoh 2 bulan (60 hari) sebelum tamat tempoh kelulusan ini bagi memperbaharui kelulusan etika.
- ii. **Study Final Report** pada penghujung kajian.
- iii. Mendapat kelulusan etika sekiranya terdapat pindaan ke atas sebarang dokumen kajian/ lokasi kajian/ penyelidik. Pihak JEPP mempunyai hak untuk menarik balik kelulusan etika sekiranya terdapat perubahan dokumen kajian yang tidak diisytiharkan.
- iv. Kajian berkenaan intervensi klinikal sahaja: Laporan mengenai **all Serious Adverse Events (SAEs), Suspected Unexpected Serious Adverse Reaction (SUSARs)** dan **Protocol Deviation/Violation** di lokasi kajian yang diluluskan oleh JEPP jika berkenaan. SAE perlu dilaporkan dalam tempoh 15 hari kalender dari kesedaran kejadian (*awareness of event*) oleh penyelidik. Laporan awal **SUSAR** perlu dikemukakan seawal mungkin tapi tidak melewati 7 hari

.../2-

Ruj.Kami : KKM/NIHSEC/P18-2338(11)

calendar dari kesedaran kejadian oleh penyelidik, disusuli dengan laporan lengkap dalam tempoh tambahan 8 hari kalender.

5. Bilangan subjek/ pesakit/ responden yang disasarkan untuk menyertai kajian ini di Malaysia adalah **345 orang**.
6. Sila ambil maklum bahawa sebarang urusan surat-menyurat berkaitan dengan penyelidikan ini haruslah dinyatakan nombor rujukan surat ini untuk melicinkan urusan yang berkaitan.

Komen (jika ada) : **NIL**

Lokasi kajian:
PEJABAT KESIHATAN DAERAH JELEBU

Keputusan Jawatankuasa Etika dan Penyelidikan Perubatan:

- () Lulus
() Tidak lulus

Tarikh Kelulusan Etika : **20-Februari-2019**

Sekian terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,


.....
DR. HJH SALINA BINTI ABDUL AZIZ
Pengerusi
Jawatankuasa Etika & Penyelidikan Perubatan
Kementerian Kesihatan Malaysia
E-mel: mresec@nih.gov.my

MMREC_ShareApproval 2019\Expedited by Primary Reviewer\Februari 2019\44674

Appendix 6: Permission to Conduct Research on Orang Asli by JAKOA



JABATAN KEMAJUAN ORANG ASLI MALAYSIA
(KEMENTERIAN PEMBANGUNAN LUAR BANDAR)
TINGKAT 3, 5, 20 & 20M, WEST BLOCK,
WISMA SELANGOR DREDGING,
142-C, JALAN AMPANG,
50450 KUALA LUMPUR



Telefon : 03-21610577
 : 03-21610504-6 (5 talian)
Gombak : 03-61892122
Faks : 03-21621470 (IP)
 : 03-61883160 (GBK)
Laman Web : www.jakoa.gov.my

Ruj. Kami : JAKOA/PP.30.052Jld14 (14)
Tarikh : 31 Oktober 2018

Fakulti Perubatan Dan Sains Kesihatan
Universiti Sains Islam Malaysia
Tingkat 13, Menara B
Persiaran MPAJ
Pandan Indah 55100 Kuala Lumpur
(u.p : Mohd Dzulkhairi bin Mohd Rani)

Tuan/Puan,

**KEBENARAN MENJALANKAN KAJIAN / PENYELIDIKAN BERKAITAN
MASYARAKAT ORANG ASLI**

Dengan hormatnya saya diarah merujuk kepada perkara tersebut di atas.

2. Jabatan ini telah meneliti permohonan tuan/puan dan sukacita dimaklumkan bahawa permohonan untuk menjalankan kajian yang bertajuk **"Prevalen, Pengetahuan, Sikap Dan Amalan Mengenai Penyakit Tidak Berjangkit (NCD) Dan Tindakan Dalam Mendapatkan Rawatan Di Kalangan Orang Asli Dewasa Di Negeri Sembilan"** telah diluluskan. Pihak tuan/puan dibenar untuk menjalankan penyelidikan tersebut mengikut ketetapan seperti berikut:-

Tajuk : **Prevalen, Pengetahuan, Sikap Dan Amalan Mengenai Penyakit Tidak Berjangkit (NCD) Dan Tindakan Dalam Mendapatkan Rawatan Di Kalangan Orang Asli Dewasa Di Negeri Sembilan**

Tempat : **Perkampungan Orang Asli Daerah Jelebu, Negeri Sembilan**

Tarikh : **10 November 2018 – 30 April 2019**

3. Pihak tuan/puan adalah diminta supaya dapat mematuhi syarat-syarat seperti mana terkandung dalam borang permohonan seperti dilampiran **Appendix 1**. Jabatan ini boleh menarik balik kelulusan menjalankan kajian sekiranya pihak tuan/puan melanggar syarat-syarat yang ditetapkan. **Di samping itu tuan/puan juga diminta mengemukakan salinan *hard copy* dan 1 salinan *soft copy* kepada JAKOA Ibu Pejabat (Bahagian Perancangan dan Penyelidikan).**

4. Disarankan agar pihak tuan/puan berhubung terus dengan Pegawai Jabatan Kemajuan Orang Asli yang berkenaan untuk mendapatkan maklumat lanjut

Ruj. Kami : JAKOA/PP.30.052Jld 13 (24)

mengenai lokasi kajian dan sebagainya. Kerjasama pihak tuan/puan berhubung perkara di atas amat dihargai dan diucapkan ribuan terima kasih.

Sekian,terima kasih

“ BERKHIDMAT UNTUK NEGARA ”

Saya yang menjalankan amanah,


(KERISMAN BIN HASBULLAH)
Bahagian Perancangan dan Penyelidikan
b.p Ketua Pengarah
Jabatan Kemajuan Orang Asli Malaysia

s.k

- Pengarah JAKOA Negeri Sembilan & Melaka (06-7638815)
- Pegawai JAKOA Daerah Jelebu (06-6137015)

Appendix 7: Maltron BF-906 Analyser Technical Specification

MALTRON PRODUCT

Technical Specifications BF-900 - BF-906 & BF-907

Technique:	Bioelectrical Impedance Analyser	
Frequency:	50Khz	
Resolution:	Measures body fat in increments of 0.1%	
Impedance Range:	200-1000 Ohms	
Accuracy:	Resistance to within 1.00% +/- 4Ω across 350-1000Ω	
Ambient Temperature Environment:	+10°C to 40°C	
Relative Humidity:	30% to 75% non-condensing	
Atmospheric Pressure:	700hPa to 1060hPa	
Test Current:	0.7mA	
Power:	BF-900 / 906	1 - 9V PP3 Battery IEC No. 6LR6L
	BF-907	4 x 1.5AA Batteries IEC No. LR6
Battery Current:	20mA (approx)	
Weight:	BF-900 / 906	.230 Kgs (0.51 lbs) with battery .180 Kgs (0.397 lbs) without battery
	BF-907	.350 kgs (0.77 lbs) with batteries .280 kgs (0.62 lbs) without batteries
Dimensions:	BF-900 / 906	145 x 80 x 34mm (5 3/4 x 3 1/8 x 1 5/16 ins)
	BF-907	228 x 70/117 x 47mm (8.98 x 2.76/4.61 x 1.85 ins)
Service:	No serviceable parts other than replacement of battery	
Guarantee:	12 months Parts and Labour (excluding disposables)	



Contents:
BF-900 or BF-906 Analyser
Maltron Electrode Cables
Maltron Electrodes
Battery
Operating Manual

OPTIONAL EXTRA:
High Impact Carrying Case



Contents:
BF-907 Analyser
Maltron Electrode Cables
Maltron Electrodes
Batteries
Operating Manual
Carrying Case



Contents:
BioScan Analyser
Maltron Electrode Cables
Maltron Electrodes
Batteries
Operating Manual
Carrying Case
Software CD's
USB2 Cable

Technical Specifications BioScan 915 - 916 - 916S

Technique:	Bioelectrical Impedance Analyser	
Frequency:	50Khz Impedance, Phase, Resistance, Reactance	
Resolution:	Measures in increments of 0.1%	
Impedance Range:	100-1000 Ohms	
Resolution:	1 Ohm	
Accuracy:	Impedance to within 0.5% +/- 3Ω across 300-1000Ω	
Phase range:	1.5 - 30.0 Degree	
Resolution:	0.1 Degree	
Accuracy:	+/- 0.1 Degree across 1.5 - 15 Degrees +/- 0.2 Degree across 15 - 30 Degrees	
Resistance range:	100R - 1000R	
Resolution:	1 Ohms	
Reactance Range:	8R - 200R	
Resolution:	0.1 ohms	
BioScan 916 Estimation of	DATA OUTPUT RESOLUTION TBW - ECW - ICW in increments of 0.1 litres (0.1pints) FFM - FM in increments of 0.1Kg (0.1lbs) BCM 0.1Kg (0.1lb)	
Printer Interface	Medically Isolated USB2	
Ambient Temperature Environment:	+10°C to 40°C	
Relative Humidity:	30% to 75% non-condensing	
Atmospheric Pressure:	700hPa to 1060hPa	
Test Current:	0.7mA	
Power:	915 / 916	4 x 1.5AA Batteries IEC No. LR6
Battery Current:	50mA (approx)	
Weight:	915 / 916	.675 kgs (1.268 lbs) with batteries .450 kgs (0.992 lbs) without batteries & Battery Compartment
Dimensions:	915 / 916	266 x 90/144 x 60mm (10.47 x 3.54/5.67 x 2.36 ins)
Service:	No serviceable parts other than replacement of batteries	
Guarantee:	12 months Parts and Labour (excluding disposable items Batteries, Cables & Electrodes)	

This device is manufactured to conform with EEC Medical Devices Directive.



ISO 9001
REGISTERED COMPANY

ISO 13485
REGISTERED COMPANY

MALTRON INTERNATIONAL LTD

P.O. Box 15
Rayleigh, Essex
SS6 9SN U.K.
Phone: 01268 778251
Int: +44 1268 778251
Fax: 01268 745176
www.maltronint.com
maltron@msn.com or enquiries@maltronint.com



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Appendix 8: Guidelines for Interviewer

GARIS PANDUAN KEPADA PENEMURAMAH

1. Informasi kepada responden	Penemuramah perlu menerangkan tujuan temuramah serta keadah temuramah dijalankan.
2. Borang persetujuan	Sila bertanya responden untuk Kad pengenalan (I/C) dan tulis nama, nombor I/C dan kampung responden di tempat yang disediakan. Sekiranya responden telah bersetuju untuk terlibat dalam kajian sila pastikan responden menandatangani borang persetujuan dan sila tulis tarikh soal selidik dijalankan. Wakil penyelidik dan saksi perlu mengisi nama, nombor I/C, tandatangan dan tarikh diruangan yang disediakan.
3. Muka hadapan	Penemuramah perlu mengisi nama diruangan nama penyelidik, tarikh dan masa mula temuramah
4. Nombor pengenalan	Isi nombor I/C, nombor telefon dan kod kawasan
5. Section A: Latar belakang subjek	Untuk soalan 1, 5, 7, 9, 12 dan 13 penemuramah perlu bertanya soalan dan mengisi jawapan diruangan yang disediakan. Untuk soalan 2, 3, 4, 6, 8, 10 dan 11 penemuramah perlu menandakan pilihan jawapan mengikut jawapan responden. Sekiranya jawapan pilihan adalah lain-lain, sila nyatakan jawapan responden
6. Section B: Saringan penyakit tidak berjangkit	Untuk soalan 1 hingga 4 penemuramah perlu menandakan jawapan yang bersesuaian mengikut jawapan responden. Untuk soalan 1, 2 dan 3, sekiranya 'Ya' soalan tambahan perlu diajukan kepada responden.
7. Section C: Pengetahuan	Untuk soalan 1, penemuramah perlu menandakan samaada 'Ya' atau 'Tidak' menurut jawapan subjek. Untuk soalan 2 hingga 7, penemuramah perlu bertanya kepada responden setiapsoalan dalam bahagian pengetahuan dan menandakan samaada 'Ya', 'Tidak' atau 'Tidak Pasti' berdasarkan jawapan responden
8. Section D: Sikap	Untuk soalan 1 hingga 15, penemuramah perlu bertanyakan kepada responden setiap pernyataan berkenaan sikap dan menandakan samaada 'Sangat setuju', 'Setuju', 'Tidak pasti', 'Tidak setuju' dan 'Sangat tidak setuju' berdasarkan jawapan responden
8. Section E: Amalan	Untuk soalan 1 hingga 5, penemuramah perlu bertanyakan kepada responden setiap pernyataan berkenaan amalan dan menandakan ruangan yang berkaitan dengan amalan responden
9. Section F: Tindakan dalam mendapatkan rawatan	Untuk soalan 1 hingga 8, penemuramah perlu menandakan pilihan jawapan mengikut jawapan responden. Sekiranya jawapan pilihan adalah lain-lain, sila nyatakan jawapan responden
10. Section G: Kebolehcapaian	Untuk soalan kebolehcapaian untuk ke pusat rawatan kesihatan kerajaan (jarak dan masa), penemuramah perlu menandakan samaada 'Ya', 'Tidak' atau 'Tidak Pasti' berdasarkan jawapan responden. Untuk soalan kebolehcapaian untuk mendapatkan rawatan dan ubat-ubatan di pusat rawatan kesihatan kerajaan, penemuramah perlu menandakan samaada 'Ya', 'Tidak' atau 'Tidak Pasti' berdasarkan jawapan responden.
11. Section H, I, J: Pemeriksaan kesihatan	Pengukuran berat dan tinggi responden menggunakan penimbang yang telah dikalibrasi. Pastikan responden dalam keadaan berdiri tegak dan memakai pakaian yang minima. Pengukuran lilit pinggang dengan meletakkan pita pengukur pada titik tengah antara margin bawah tulang rusuk terakhir dan atas puncak iliac. Pengukuran tekanan darah systolic dan diastolic responden menggunakan alat tekanan darah. Untuk aras glukosa, penemuramah perlu menggunakan glucometer dan glucostrip yang disediakan untuk membuat pengukuran aras glukosa. Sila tanda samada bacaan dalam keadaan responden berpuasa atau random. Pengukuran komposisi tubuh dijalankan menggunakan BIA. Sila pastikan responden tidak memakai barangan yang diperbuat daripada besi atau emas.

Terima kasih

Appendix 9: Questionnaire (Quantitative research)



BORANG KAJI SELIDIK

Kajian Berkenaan:

Prevalen, pengetahuan, sikap dan amalan mengenai penyakit tidak berjangkit (NCD) dan tindakan dalam mendapatkan rawatan dikalangan Orang Asli dewasa di Negeri Sembilan.

Senarai Semak	✓
Jemputan menyertai kajian dan persetujuan subjek	
A. Sosiodemografi	
B. Sejarah dan saringan kesihatan	
C. Kaji selidik tentang pengetahuan penyakit tidak berjangkit	
D. Kaji selidik tentang sikap terhadap penyakit tidak berjangkit	
E. Kaji selidik tentang amalan terhadap penyakit tidak berjangkit	
F. Kaji selidik tindakan dalam mendapatkan rawatan	
G. Kebolehcapaian dalam mendapatkan rawatan	
H. Anthropometri	
I. Pengukuran komposisi lemak badan	
J. Pemeriksaan tekanan darah	
K. Pemeriksaan gula dalam darah	

Nama Penyelidik: _____
 Fakulti: _____
 No. Tel: _____

Tarikh:	Masa mula:	am/pm	Masa diambil: J Min
	Masa tamat:	am/pm	

No. Unit: _____ Kod kawasan/lokalti: _____

A: LATAR BELAKANG SUBJEK

1. No Kad Pengenalan _____
2. No. Tel _____
3. Umur: _____ tahun
4. Jantina: Lelaki
 Perempuan
5. Etnik: Orang Asli Semenanjung: _____
 Lain-lain _____
6. Tempoh menetap _____ tahun
7. Taraf perkahwinan Belum pernah berkahwin Berkahwin
 Balu/Duda Bercerai/Berpisah tetap
8. Tahap pendidikan Tiada pendidikan formal
 Tidak tamat darjah 6
 Tamat darjah 6
 Tamat tingkatan 3
 Tamat Tingkatan 5
 Lain-lain _____
9. Adakah anda masih bekerja? Ya Tidak
10. Jika Ya (/), apakah pekerjaan anda? _____
11. Kategori pekerjaan Kerajaan Separa kerajaan (GLC)
 Swasta Bekerja sendiri
12. Sekiranya Tidak (/), nyatakan sebabnya. Suri rumah Menganggur
 Lain-lain Pelajar
 Pencen. Nyatakan jumlah pencen. RM _____
13. Berapakah jumlah purata pendapatan anda dalam sebulan? RM _____
14. Berapakah jumlah purata pendapatan isi rumah anda dalam sebulan? RM _____

B: SEJARAH DAN SARINGAN KESIHATAN

1. Adakah anda mempunyai penyakit yang telah didiagnos oleh doktor? Tandakan lebih dari satu pilihan jawapan sekiranya ada.

No	Penyakit	Jika ya, berapa lamakah anda telah mengalami penyakit ini (dalam tahun dan bulan)		Adakah anda mengambil ubat bagi penyakit ini (preskripsi dari doktor)	
		Ya	Tidak	Ya	Tidak
a	Tekanan darah tinggi				
b	Tinggi kolesterol				
c	Kencing manis				
d	Lain-lain:				

2. Adakah anda pernah MEROKOK ?

Ya 1 Tidak 0
Penggunaan rokok: _____ (jumlah purata/sehari)

3. Adakah anda mengambil MINUMAN BERALKOHOL?

Ya 1 Tidak 0
Berapakah kali/unit dalam seminggu: _____

4. Adakah anda memperuntukkan masa untuk BERSENAM sekurang-kurangnya 30 minit untuk 3 kali seminggu atau lebih?

Ya 0 Tidak 1

5. Adakah anda mengambil SAYURAN sebanyak sekurang-kurangnya 3 kali pada setiap hari?
 Ya Tidak

C: PENGETAHUAN PENYAKIT TIDAK BERJANGKIT

1. Adakah anda tahu apakah itu penyakit tidak berjangkit?

Ya Tidak

2. Manakah antara berikut penyakit tidak berjangkit?

	Ya	Tidak	Tidak Pasti
a) Kencing manis/diabetes	1	0	0
b) Batuk kering/Tibi	0	1	0
c) Asma	1	0	0
d) Demam denggi	0	1	0
e) Sakit jantung	1	0	0
f) Penyakit kencing tikus/Leptospirosis	0	1	0

3. Manakah antara berikut faktor risiko SERANGAN JANTUNG?

	Ya	Tidak	Tidak Pasti
a) Pengambilan makanan yang mengandungi kandungan lemak yang tinggi secara kerap (contohnya nasi lemak, ayam goreng)	1	0	0
b) Mengamalkan diet yang seimbang	0	1	0
c) Merokok	1	0	0
d) Melakukan aktiviti senaman/fizikal secara berkala	0	1	0

4. Manakah antara berikut faktor risiko penyakit LUMPUH SEPARUH BADAN/STROK?

	Ya	Tidak	Tidak Pasti
a) Tekanan darah tinggi/hipertensi	1	0	0
b) Melakukan aktiviti senaman/fizikal secara berkala	0	1	0
c) Mengamalkan diet yang seimbang	0	1	0
d) Kegemukan/obesiti	1	0	0

5. Manakah antara berikut berkenaan penyakit TEKAPAN DARAH TINGGI/HIPERTENSI?

	Ya	Tidak	Tidak Pasti
a) Seseorang itu menghidap penyakit tekanan darah tinggi sekiranya bacaan sistolik(bacaan atas) melebihi 140	1	0	0
b) Seseorang yang mempunyai tekanan darah tinggi tidak perlu mengambil ubat seperti yang telah ditetapkan	1	0	0
c) Seseorang yang gemuk/obese mempunyai risiko yang tinggi untuk mendapat penyakit tekanan darah tinggi	0	1	0
d) Seseorang yang menghidap darah tinggi/hipertensi tidak perlu menjalani rawatan susulan secara berkala di pusat kesihatan/klinik	0	1	0

6. Manakah antara berikut berkenaan penyakit KENCING MANIS/DIABETES?

	Ya	Tidak	Tidak Pasti
a) Pengambilan makanan berkanji secara berlebihan seperti nasi, mee dan roti menyebabkan penyakit kencing manis	1	0	0
b) Seseorang yang ahli keluarganya menghidap kencing manis berisiko untuk mendapat penyakit kencing manis	1	0	0
c) Pesakit kencing manis tidak perlu mengambil ubat suntikan	0	1	0
d) Penyakit kencing manis tidak boleh menyebabkan kerosakan buah pinggang	0	1	0

7. Manakah antara berikut berkenaan tanda-tanda penyakit PARU-PARU KRONIK(COPD)?

		Ya	Tidak	Tidak Pasti
a)	Nafas tercungap-cungap	1	0	0
b)	Pengeluaran kahak dalam kuantiti yang banyak	1	0	0
c)	Pernafasan diikuti oleh siulan dan bunyi	1	0	0
d)	Batuk kronik melebihi tiga bulan	1	0	0

D: SIKAP PENYAKIT TIDAK BERJANGKIT

Penyataan	Sangat setuju	Setuju	Tidak pasti	Tidak setuju	Sangat tidak setuju
1. Anda merasakan penting untuk menjaga kesihatan anda sekarang	5	4	3	2	1
2. Anda merasakan penting untuk mengamalkan pemakanan yang seimbang secara berterusan	5	4	3	2	1
3. Jika anda mengalami sebarang penyakit tidak berjangkit, anda akan berusaha untuk mengawal penyakit tersebut daripada menjadi lebih teruk	5	4	3	2	1
4. Pada usia anda sekarang, aktiviti bersukan/fizikal secara berkala tidak penting untuk menjaga kesihatan anda	1	2	3	4	5
5. Anda tidak membawa bersama ubat-ubatan anda apabila mengunjungi saudara yang berada di tempat jauh selama seminggu	1	2	3	4	5
6. Anda merasakan tidak perlu mengambil makanan mengikut kalori yang anda perlukan untuk aktiviti harian anda	1	2	3	4	5
7. Pada pendapat anda, pengambilan ubat/suntikan yang diberikan oleh doktor sekali-sekala tanpa mengikut jadual yang ditetapkan dapat mengawal komplikasi kencing manis	1	2	3	4	5
8. Walaupun anda mengidap penyakit kencing manis, anda masih akan mengambil makanan yang mengandungi gula yang tinggi	1	2	3	4	5
9. Jika ahli keluarga anda merokok, anda akan berusaha menasihati mereka untuk berhenti merokok	5	4	3	2	1
10. Dalam pemilihan makanan, anda akan pastikan makanan tersebut mengandungi kurang lemak	5	4	3	2	1
11. Sekiranya anda menghidap penyakit darah tinggi, anda masih meneruskan pengambilan garam berlebihan	1	2	3	4	5
12. Seseorang yang menghidap tekanan darah tinggi tidak perlu menjalani pemeriksaan tekanan darah ketika rawatan susulan	1	2	3	4	5
13. Anda akan memberikan bantuan kewangan sekiranya ahli keluarga anda menghidap strok	5	4	3	2	1
14. Anda sanggup menjaga ahli keluarga anda sekiranya mereka menghidap penyakit strok	5	4	3	2	1
15. Anda akan menggalakkan ahli keluarga anda yang perempuan untuk menjalani penyaringan kanser payudara di pusat kesihatan	5	4	3	2	1

E:AMALAN PENYAKIT TIDAK BERJANGKIT

Sila tandakan pernyataan yang bersesuaian dengan gaya hidup dan amalan subjek

Pernyataan		Kerap	Jarang	Tidak pernah
1	Saya menghabiskan sekurang-kurangnya 30 minit untuk bersenam, 3 kali atau lebih seminggu	2	1	0
2	Saya merupakan seorang perokok	0	1	2
3	Saya mengambil minuman beralkohol	0	1	2
4	Saya makan sayur-sayuran sekurang-kurangnya 3 hidangan setiap hari	2	1	0
5	Saya menimbang berat saya setiap minggu	2	1	0

F: TINDAKAN DALAM MENDAPATKAN RAWATAN

1. Sekiranya anda sakit, adakah anda pergi untuk mendapatkan rawatan?

Ya Tidak

2. Jika tidak, apakah sebabnya?

(Pilih satu sahaja)

Tidak mampu dengan kos rawatan yang tinggi	1
Tidak percaya/suka dengan perkhidmatan kemudahan kesihatan yang disediakan	2
Masalah jarak/kenderaan	3
Tidak pasti ke mana harus pergi	4
Tidak cukup masa/sibuk dengan kerja	5
Tidak kisah dengan sakit yang dihidapi tersebut	6

Jika 'TIDAK' sila berhenti di sini

3. Apakah PILIHAN RAWATAN anda?

Moden	1
Alternatif/ Tradisional	2
Kedua-duanya	3

* Sekiranya pilihan subjek adalah RAWATAN MODEN atau KEDUA-DUANYA sila teruskan dengansoalan kelima dan seterusnya. Pilih satu sahaja jawapan bagi setiapsoalan.

*Sekiranya pilihan subjek adalah ALTERNATIF/ TRADISIONAL teruskan dengansoalan ke tujuh dan seterusnya. Pilih satu sahaja jawapan bagi setiapsoalan.

4. Nyatakan rawatan kesihatan moden yang PALING KERAP anda kunjungi untuk mendapatkan rawatan.

Klinik kerajaan	1	Klinik swasta	3
Hospital kerajaan	2	Hospital swasta	4
		Farmasi	5

5. Nyatakan rawatan tradisional yang KERAP anda gunakan untuk mengatasi masalah kesihatan anda.

Urutan tradisional	1	Halaq/ Batin tradisional	2
Pengamal pengubatan Islam	3	Lain-lain. Nyatakan:4	

Appendix 10, continued

6. Nyatakan ubat tradisional yang paling kerap anda gunakan untuk mengatasi masalah kesihatan anda.

Akar Kayu	1	Makjun/Jamu	3
Air penawar /rawatan daripada halak	2	Lain-lain. Nyatakan:	4

G. KEBOLEHCAPAIAN

1. Kebolehcapaian untuk ke pusat rawatan kesihatan kerajaan(jarak dan masa)

Soalan		Ya	Tidak	Tidak pasti
a)	Adakah anda merasakan jarak antara rumah dan pusat rawatan kesihatan kerajaan adalah dekat?	1	0	2
b)	Adakah anda tidak mengalami sebarang masalah dari segi	1	0	2

	pengangkutan untuk ke pusat rawatan kesihatan kerajaan?			
c)	Adakah waktu operasi bagi pusat rawatan kesihatan kerajaan di tempat anda adalah bersesuaian?	1	0	2
d)	Pada pendapat anda, adakah waktu menunggu di pusat rawatan kesihatan kerajaan membebankan?	1	0	2

2. Kebolehcapaian untuk mendapatkan rawatan dan ubat-ubatan di pusat rawatan kesihatan kerajaan

	Soalan	Ya	Tidak	Tidak pasti
a)	Adakah kemudahan rawatan dan perkhidmatan kesihatan kerajaan di tempat anda pada tahap yang baik?	1	0	2
b)	Adakah ubat-ubatan yang diperlukan boleh diperolehi daripada kemudahan kesihatan kerajaan (hospital/klinik)?	1	0	2
c)	Adakah anda merasakan ubat-ubatan moden lebih mudah didapati berbanding ubat-ubatan tradisional	1	0	2
d)	Adakah anda berasa selesa dan akan terus mendapatkan rawatan di pusat rawatan kesihatan kerajaan	1	0	2
e)	Adakah anda akan mengesyorkan ahli keluarga dan rakan-rakan anda untuk mendapatkan rawatan di pusat rawatan kesihatan kerajaan	1	0	2

H. PEMERIKSAAN FIZIKAL

No	Parameter	Bacaan 1	Bacaan 2	Purata
1	Tinggi (cm)			
2	Berat (kg)			
3	Index Jisim Tubuh (kg/m ²)			
4	Lilitan pinggang			

I. PENGUKURAN KOMPOSISI LEMAK BADAN

Parameter	Bacaan 1	Bacaan 2	Bacaan 3	Purata
Body Fat, %				
Body Fat Mass, Kg				
Target Body Fat, % (min/max)				
Body Mass Index (weight/height ²)				
Basal Metabolic Rate				
Target weight (min/max)				

J. PEMERIKSAAN TEKANAN DARAH

	Bacaan 1	Bacaan 2	Purata
Sistolik (mmHg)			
Diastolik (mmHg)			

K. PEMERIKSAAN GULA DALAM DARAH

Pemeriksaan glukosa (Puasa/Random)	Nilai
Puasa: <6.1 mmol/L Random: <11.1 mmol/L	

WAWANCARA TAMAT

Appendix 10: Patients Information Sheet (Quantitative Research)

RISALAH MAKLUMAT PESERTA FASA 1 (KUANTITATIF)

Tajuk penyelidikan	: Prevalen, Pengetahuan, Sikap dan Amalan tentang Penyakit Tidak Berjangkit (NCD) dan Penentu Kesihatan di kalangan Orang Asli Dewasa di Jelebu, Negeri Sembilan
Nama Penyelidik	: Prof. Madya Dr. Mohd Dzulkhairi bin Mohd Rani
Nama Institusi	: Jabatan Kesihatan Primer, Fakulti Perubatan dan Sains Kesihatan, Universiti Sains Islam Malaysia (USIM)
Nama Penaja	: Pusat Penyelidikan MIZAN, USIM

1. Pengenalan:

Anda dijemput untuk menyertai kajian ini kerana anda merupakan subjek yang telah terpilih secara rawak untuk terlibat dalam kajian ini. Risalah ini menjelaskan hal-hal berkenaan penyelidikan tersebut dengan lebih mendalam dan terperinci. Amat penting anda memahami mengapa penyelidikan ini dilakukan dan apa yang dilakukan dalam penyelidikan ini. Sila ambil masa yang secukupnya untuk membaca dan mempertimbangkan dengan teliti penerangan yang diberi sebelum anda bersetuju untuk menyertai penyelidikan ini. Jika ada sebarang kemusykilan ataupun maklumat lanjut yang anda ingin tahu, anda boleh bertanya dengan mana-mana kakitangan yang terlibat dalam penyelidikan ini. Setelah anda berpuashati bahawa anda memahami penyelidikan ini, dan anda berminat untuk turut serta, anda dikehendaki untuk menandatangani Borang Persetujuan atau Keizinan Peserta, pada muka surat akhir risalah ini. Untuk menyertai penyelidikan ini, anda perlu memberi doktor anda maklumat sejarah kesihatan ataupun penyakit anda yang lalu; jika anda tidak beriterus terang anda mungkin boleh menimbulkan masalah pada diri anda di kemudian hari.

Penyertaan anda dalam penyelidikan ini adalah secara sukarela. Anda tidak perlu menyertai penyelidikan ini jika anda tidak mahu. Anda juga mempunyai hak untuk tidak menjawab mana-manasoalan yang anda tidak mahu jawab. Anda juga boleh menarik diri daripada penyelidikan ini pada bila-bila masa sahaja. Jika anda menarik diri, segala maklumat yang telah diperolehi sebelum anda menarik diri tetap akan digunakan dalam penyelidikan ini. Jika anda tidak mahu menyertai ataupun menarik diri dari penyelidikan ini, tindakan anda tidak akan menjejaskan segala hak dan keistimewaan perubatan kesihatan yang selayaknya anda terima.

Penyelidikan ini telah mendapat kelulusan Jawatankuasa Etika dan Penyelidikan Perubatan, Kementerian Kesihatan Malaysia.

2. Apakah tujuan penyelidikan ini dilakukan?

Tujuan penyelidikan ini dilakukan adalah untuk mengkaji prevalen, pengetahuan, sikap dan amalan mengenai penyakit tidak berjangkit (NCDs) dan faktor penentuan kesihatan dikalangan Orang Asli dewasa di Negeri Sembilan. Penyelidikan ini diperlukan kerana hasil kajian ini boleh digunakan untuk menyusun strategi dan membangunkan modul yang komprehensif dan menyeluruh untuk mencegah dan mengawal penyakit tidak berjangkit di kalangan masyarakat. Ini termasuklah promosi kesihatan dan juga aktiviti pendidikan. Sejumlah 345 peserta seperti anda daripada daerah Jelebu Negeri Sembilan akan menyertai penyelidikan ini. Penyelidikan ini akan berlangsung selama setahun dan tempoh pembabitian anda dianggarkan selama sehari. Sekiranya anda terpilih, anda akan dihubungi untuk Fasa 2 kajian yang bakal melibatkan 30 peserta.

3. Apakah prosedur penyelidikan yang akan saya terima?

Sekiranya anda bersetuju untuk menyertai penyelidikan ini, dua peringkat kajian akan dijalankan. Soalan kaji selidik ini adalah mengenai status kesihatan, pengetahuan, amalan dan praktis mengenai penyakit tidak berjangkit. Soalan mengenai kebolehcapaian untuk mendapatkan perkhidmatan kesihatan juga akan diajukan. Peringkat kedua adalah pemeriksaan antropometri/fizikal dan pengambilan darah diujung jari (satu titik) untuk pengukuran gula dalam darah.

4. Apakah tanggungjawab saya sewaktu menyertai penyelidikan ini?

Amat penting anda menjawab kesemuasoalan yang ditanyakan oleh kakitangan penyelidikan dengan jujur dan lengkap.

5. Apakah risiko dan kesan-kesan sampingan menyertai penyelidikan ini?

Risiko akibat pemeriksaan fizikal dan rasa sakit akibat daripada pengambilan darah (jari dicucuk) dalam kajian ini adalah sangat minimum. Tiada kesan sampingan yang dikenal pasti. Anda boleh mengemukakan pertanyaan kepada penyelidik untuk maklumat lanjut mengenai risiko dan kesan sampingan secara lebih mendalam. Penyelidik akan memberikan informasi tambahan secara terus kepada anda sekiranya terdapat sebarang perubahan pelaksanaan dalam kajian ini. Sekiranya anda tidak bersetuju, anda boleh menarik diri dari kajian ini.

6. Apakah manfaatnya saya menyertai kajian ini?

Penyelidikan ini mungkin akan mendatangkan manfaat ataupun langsung tiada memberi apa-apa manfaat kepada anda. Segala maklumat yang diperolehi daripada penyelidikan ini akan dapat membantu dalam menambahbaik penentuan kesihatan di dalam komuniti anda.

7. Apakah yang akan terjadi sekiranya saya tercedera semasa menyertai kajian ini?

Jika anda tercedera kerana penyertaan anda dalam penyelidikan ini, anda haruslah menghubungi doktor penyelidikan anda. Sekiranya kecederaan fizikal/badan atau penyakit terhasil secara langsung akibat daripada prosedur perubatan yang dijalankan dalam penyelidikan ini, pihak penyelidik akan membayar segala kos rawatan berpatutan yang diperlukan. Tetapi pihak penaja tidak akan bertanggungjawab terhadap perbelanjaan perubatan bagi penyakit atau rawatan yang telah wujud sebelum penyertaan anda dalam penyelidikan ini, ataupun mana-mana proses rawatan yang sedang anda ikuti, ataupun sebarang masalah yang timbul sama ada daripada kecuaiannya sendiri atau salah laku yang disengajakan, ataupun kecuaiannya atau salah laku yang disengajakan sama ada oleh pihak doktor penyelidikan anda, pihak tapak/lokasi/pusat penyelidikan, mahupun mana-mana pihak ketiga yang terlibat. Walaubagaimanapun, anda tetap tidak kehilangan mana-mana hak anda di sisi undang-undang untuk mendapatkan pampasan sekalipun anda sudah menandatangani borang ini.

8. Siapakah yang membiayai penyelidikan ini?

Kajian ini ditaja sepenuhnya oleh pihak penyelidik yang akan membayar semua produk penyelidikan dan prosedur yang berkaitan. Mana-mana prosedur dan rawatan lain yang tidak diperlukan dalam penyelidikan ini tetapi merupakan sebahagian daripada rawatan harian anda, adalah tanggungan anda sendiri ataupun pihak insurans anda.

9. Bolehkah penyelidikan ataupun penyertaan saya ditamatkan lebih awal daripada yang dirancang?

Doktor penyelidikan atau penaja boleh menamatkan penyelidikan ini ataupun menamatkan penyertaan anda dalam penyelidikan ini pada bila-bila masa, jika ia perlu demi keselamatan anda. Jika penyelidikan ini dihentikan terlebih awal, di atas sebab-sebab tertentu, anda akan dimaklumkan.

10. Adakah maklumat perubatan saya akan dirahsiakan ?

Segala maklumat anda yang diperolehi dalam penyelidikan ini akan disimpan dan dikendalikan secara sulit, bersesuaian dengan peraturan-peraturan dan/ atau undang-undang yang berkenaan. Sekiranya hasil penyelidikan ini diterbitkan atau dibentangkan kepada orang ramai, identiti anda tidak akan didedahkan tanpa kebenaran anda terlebih dahulu. Pihak-pihak tertentu seperti individu yang terlibat dalam penyelidikan dan rawatan perubatan anda, juruaudit dan jurupantau yang terlatih, pihak penaja atau pihak gabungannya, pihak berkuasa kerajaan atau undang-undang, boleh memeriksa dan membuat salinan laporan perubatan anda jika berkenaan dan diperlukan.

Anda tidak akan dimaklumkan mengenai penemuan kajian. Anda akan dimaklumkan jika maklumat baru tersedia berkaitan dengan persetujuan kajian.

11. Siapakah yang perlu saya hubungi sekiranya saya mempunyai sebarang pertanyaan?

Anda boleh menghubungi doktor penyelidikan ini PROF. MADYA DR. MOHD DZULKHAIRI BIN MOHD RANI pada sambungan telefon 03-42892400 / 019-9353965 sekiranya anda mempunyai sebarang pertanyaan mengenai penyelidikan ini atau jika anda mengesyaki anda mengalami kecederaan yang terhasil daripada penyelidikan ini dan anda mahukan maklumat tentang rawatannya.

Jika anda mempunyai sebarang pertanyaan berkaitan dengan hak-hak anda sebagai peserta dalam penyelidikan ini, sila hubungi: Setiausaha, Jawatankuasa Etika & Penyelidikan Perubatan, Kementerian Kesihatan Malaysia, melalui talian telefon 03-2287 4032.

Appendix 11: Consent Form (Quantitative research)

**BORANG PERSETUJUAN/ KEIZINAN PESERTA
FASA 1 (KUANTITATIF)**

Tajuk Penyelidikan : Prevalen, Pengetahuan, Sikap dan Amalan tentang Penyakit Tidak Berjangkit (NCD) dan Penentu Kesihatan di kalangan Orang Asli Dewasa di Negeri Sembilan

Dengan menandatangani di bawah, saya mengesahkan bahawa :

- i. Saya telah diberi maklumat tentang penyelidikan di atas secara lisan dan bertulis dan saya telah membaca dan memahami segala maklumat yang diberikan dalam risalah ini.
- ii. Saya telah diberikan masa yang secukupnya untuk mempertimbangkan penyertaan saya dalam penyelidikan ini dan telah diberi peluang untuk bertanyakansoalan dan semua persoalan saya telah dijawab dengan sempurna dan memuaskan.
- iii. Saya juga faham bahawa penyertaan saya adalah secara sukarela dan pada bila-bila masa saya bebas menarik diri daripada penyelidikan ini tanpa harus memberi sebarang alasan dan ianya sama sekali tidak akan menjejaskan rawatan perubatan saya pada masa akan datang. Saya tidak mengambil bahagian dalam mana-mana penyelidikan lain pada masa ini. Saya juga memahami tentang risiko dan manfaat penyelidikan ini dan saya secara sukarela memberi persetujuan untuk menyertai penyelidikan ini di bawah syarat-syarat yang telah dinyatakan di atas. Saya faham saya harus mematuhi nasihat dan arahan yang berkaitan dengan penyertaan saya dalam penyelidikan ini daripada doktor penyelidikan (penyelidik) .
- iv. Saya faham bahawa kakitangan penyelidikan, pemantau dan juruaudit terlatih, pihak penaja atau gabungannya, dan pihak berkuasa kerajaan atau undang-undang, mempunyai akses langsung dan boleh menyemak laporan perubatan saya bagi memastikan penyelidikan ini dijalankan dengan betul dan data direkodkan dengan betul. Segala maklumat dan data peribadi akan dianggap sebagai SULIT.
- v. Saya akan menerima satu salinan 'Risalah Maklumat Peserta dan Borang Persetujuan atau Keizinan Peserta' yang telah lengkap dengan tarikh dan tandatangan untuk dibawa pulang ke rumah.

Saya bersetuju/ tidak bersetuju* untuk doktor yang merawat keluarga saya diberitahu tentang penyertaan saya dalam penyelidikan ini. (*Potong mana yang tidak berkenaan)

Subjek :

Tandatangan:

Nama:

Nombor K/P:

Tarikh :

Penyelidik yang mengendalikan proses menandatangani borang keizinan:

Tandatangan:

Nama:

Nombor K/P:

Tarikh :

Saksi tidak-berpihak/adik: (Diperlukan; jika subjek adalah buta huruf dan kandungan risalah maklumat peserta disampaikan secara lisan kepada subjek)

Tandatangan:

Nama:

Nombor K/P:

Tarikh :

Appendix 12: Questionnaire (Qualitative research)



BORANG KAJI SELIDIK KAJIAN KUALITATIF

Kajian Berkenaan:

Prevalen, Pengetahuan, Sikap dan Amalan tentang Penyakit Tidak Berjangkit (NCD) dan Penentu Kesihatan di kalangan Orang Asli Dewasa di Jelebu, Negeri Sembilan

Nama Penyelidik : _____

Fakulti : _____

No. Tel : _____

No. Unit : _____

Kod kawasan/lokalti : _____

Komponen Pengenalan:		
1.	Ucapan terima kasih	Saya ingin mengucapkan terima kasih kerana kesudian anda untuk bertemu dengan saya hari ini.
2.	Nama pewawancara	Nama saya _____ dan saya ingin untuk bercakap dengan anda mengenai pendapat anda mengenai kesihatan dan faktor-faktor yang mempengaruhi kesihatan.
3.	Tujuan	Hasil daripada wawancara ini akan memberikan maklumat berguna untuk perancangan program intervensi dan pendidikan pada masa depan.
4.	Tempoh	Wawancara perlu mengambil masa kurang daripada satu jam.
5.	Bagaimana wawancara dijalankan	Saya akan merakam sesi kerana saya tidak mahu ketinggalan sebarang komen daripada anda. Walaupun saya akan mengambil beberapa nota semasa sesi, saya tidak boleh mungkin menulis cukup cepat untuk mendapatkan semuanya. Kerana itu kita merakamkan wawancara ini, sila pastikan untuk bercakap supaya kami tidak terlepas komen anda.
6.	Kerahsiaan	Semua jawapan akan dirahsiakan. Ini bermakna bahawa wawancara ini hanya akan dikongsi bersama dengan pasukan penyelidikan ahli dan kami akan memastikan apa-apa maklumat yang kami sertakan laporan kami tidak mengenal pasti anda sebagai responden. Anda juga tidak perlu bercakap tentang apa sahaja yang anda tidak mahu dan anda boleh menamatkan temuduga pada bila-bila masa.
7.	Peluang untuksoalan	Adakah terdapat sebarangsoalan mengenai apa yang saya baru jelaskan?Adakah anda sanggup menyertai wawancara ini?
8.	Tandatangan persetujuan	Sekiranya anda sudi, anda diminta untuk menandatangani borang persetujuan untuk menyertai kajian

Soalan Utama:		
9.	Latar belakang diri	<ul style="list-style-type: none"> i. Beritahu saya tentang sejarah anda di kampung ini? ii. Berapa lama anda tinggal di kampung ini? iii. Adakah anda ingat peralihan dari penempatan sebelumnya ke kampung ini? Bolehkah anda terangkan dengan lebih lanjut?
10.	Kesihatan dan faktor penentu kesihatan	<ul style="list-style-type: none"> iv. Bagaimanakah anda menggambarkan kesihatan anda sekarang? Kenapa awak berkata demikian? v. Adakah perkara yang memberi anda kesihatan yang baik? vi. Adakah perkara-perkara apa yang menyebabkan kemerosotan kesihatan pada diri anda?
11.	Pemakanan	<ul style="list-style-type: none"> vii. Adakah diet / makanan anda berubah dalam sepuluh tahun yang lalu? viii. Adakah faktor-faktor yang mempengaruhi penggunaan buah-buahan dan sayur-sayuran dari segi sosial, ekonomi, geografi dan akses kepada anda?
12.	Aktiviti fizikal	<ul style="list-style-type: none"> ix. Beritahu saya tentang pengalaman anda di kampung ini, dari segi cabaran atau kesukaran dan sokongan dalam menjalankan aktiviti fizikal? x. Bolehkah anda terangkan dengan lebih lanjut kesan kepada kesihatan sekiranya anda aktif dan tidak aktif secara fizikal?
13.	Pengambilan alkohol	<ul style="list-style-type: none"> xi. Berdasarkan pemerhatian anda, apakah faktor yang mempengaruhi penggunaan alkohol yang berlebihan seseorang?
14.	Merokok	<ul style="list-style-type: none"> xii. Adakah kesan negatif dan risiko pengambilan alkohol kepada kesihatan
15.	Persepsi kesihatan	<ul style="list-style-type: none"> xiii. Pada pendapat anda, apakah faktor yang mempengaruhi seseorang itu untuk mula merokok xiv. Pada pendapat anda, apakah faktor yang boleh mendorong seseorang untuk berhenti merokok? xv. Menurut pandangan anda, adakah tahap kesihatan penduduk di penempatan ini pada tahap memuaskan? Kenapa? xvi. Bagaimana pandangan anda tentang perkhidmatan kesihatan moden di tempat anda? Mengapa anda berkata begitu? xvii. Adakah anda dan penduduk kampung masih mengamalkan perubatan tradisional? Mengapa anda berkata begitu?
Komponen Penutupan:		
16.	Tambahan komen	Adakah ada lagi perkara yang anda mahu tambah?
17.	Langkah seterusnya	Tolong hubungi saya jika anda ingin tahu apa-apa mengenai kajian ini atau jika anda mahukan nasihat atau maklumat daripada saya.
18.	Terima kasih	Terima kasih atas waktunya.

WAWANCARA TAMAT

Appendix 13: Patient Information Sheet (Qualitative Research)

RISALAH MAKLUMAT PESERTA: SUB-KAJIAN KUALITATIF

Tajuk penyelidikan	: Prevalen, Pengetahuan, Sikap dan Amalan tentang Penyakit Tidak Berjangkit (NCD) dan Penentu Kesihatan di kalangan Orang Asli Dewasa di Jelebu, Negeri Sembilan
Nama Penyelidik	: Prof. Madya Dr. Mohd Dzulkahiri Bin Mohd Rani
Nama Institusi	: Jabatan Kesihatan Primer, Fakulti Perubatan dan Sains Kesihatan, Universiti Sains Islam Malaysia
Nama Penaja	: Pembiayaan Sendiri (Penyelidik)

Pengenalan:

Anda dijemput untuk menyertai kajian ini kerana anda merupakan subjek yang telah terpilih secara rawak untuk terlibat dalam kajian ini. Risalah ini menjelaskan hal-hal berkenaan penyelidikan tersebut dengan lebih mendalam dan terperinci. Amat penting anda memahami mengapa penyelidikan ini dilakukan dan apa yang dilakukan dalam penyelidikan ini.

Sila ambil masa yang secukupnya untuk membaca dan mempertimbangkan dengan teliti penerangan yang diberi sebelum anda bersetuju untuk menyertai penyelidikan ini. Jika ada sebarang kemusykilan ataupun maklumat lanjut yang anda ingin tahu, anda boleh bertanya dengan mana-mana kakitangan yang terlibat dalam penyelidikan ini. Setelah anda berpuashati bahawa anda memahami penyelidikan ini, dan anda berminat untuk turut serta, anda dikehendaki untuk menandatangani Borang Persetujuan atau Keizinan Peserta, pada muka surat akhir risalah ini.

Penyertaan anda dalam penyelidikan ini adalah secara sukarela. Anda tidak perlu menyertai penyelidikan ini jika anda tidak mahu. Anda juga mempunyai hak untuk tidak menjawab mana-manasoalan yang anda tidak mahu jawab. Anda juga boleh menarik diri daripada penyelidikan ini pada bila-bila masa sahaja. Jika anda menarik diri, segala maklumat yang telah diperolehi sebelum anda menarik diri tetap akan digunakan dalam penyelidikan ini. Jika anda tidak mahu menyertai ataupun menarik diri dari penyelidikan ini, tindakan anda tidak akan menjejaskan segala hak dan keistimewaan perubatan kesihatan yang selayaknya anda terima.

Penyelidikan ini telah mendapat kelulusan Jawatankuasa Etika dan Penyelidikan Perubatan, Kementerian Kesihatan Malaysia.

1. Apakah tujuan penyelidikan ini dilakukan?

Tujuan penyelidikan ini dilakukan adalah untuk mengkaji faktor penentuan kesihatan dikalangan Orang Asli dewasa di Negeri Sembilan. Penyelidikan ini diperlukan kerana hasil kajian ini boleh digunakan untuk menyusun strategi dan membangunkan modul yang komprehensif dan menyeluruh untuk mencegah dan mengawal penyakit tidak berjangkit di kalangan masyarakat. Ini termasuklah promosi kesihatan dan juga aktiviti pendidikan.

Sejumlah 30 peserta seperti anda daripada daerah Jekebu Negeri Sembilan di Malaysia akan menyertai penyelidikan ini. Penyelidikan berlaku sepanjang 12 bulan dalam jumlah. Pada masa itu, kami akan melawat anda sebanyak satu kali untuk mewawancara anda dan wawancara tersebut akan berlangsung selama kira-kira satu jam.

2. Apakah prosedur penyelidikan yang akan saya terima?

Sekiranya anda bersetuju untuk menyertai penyelidikan ini, soalan kaji selidik akan diajukan kepada anda berdasarkan model faktor penentu kesihatan oleh Londonde, 1974. Sekiranya anda tidak ingin menjawab mana-manasoalan semasa temu bual, anda boleh mengatakan demikian dan pewawancara akan beralih kepadasoalan seterusnya. Tidak ada orang lain tetapi pewawancara akan hadir melainkan jika anda mahu orang lain berada di sana. Maklumat yang direkodkan adalah sulit, dan tidak ada orang lain kecuali kumpulan penyelidik akan mengakses maklumat yang didokumenkan semasa wawancara anda. Keseluruhan wawancara akan direkodkan secara audio, tetapi tiada siapa yang akan dikenal pasti dengan nama pada audio.

3. Apakah tanggungjawab saya sewaktu menyertai penyelidikan ini?

Amat penting anda menjawab kesemuasalahan yang ditanyakan oleh kakitangan penyelidikan dengan jujur dan lengkap.

4. Apakah risiko dan kesan-kesan sampingan menyertai penyelidikan ini?

Tiada kesan sampingan yang dikenal pasti. Anda boleh mengemukakan pertanyaan kepada penyelidik untuk maklumat lanjut mengenai risiko dan kesan sampingan secara lebih mendalam. Penyelidik akan memberikan infomasi tambahan secara terus kepada anda sekiranya terdapat sebarang perubahan pelaksanaan dalam kajian ini. Sekiranya anda tidak bersetuju, anda boleh menarik diri dari kajian ini.

5. Apakah manfaatnya saya menyertai kajian ini?

Penyelidikan ini mungkin akan mendatangkan manfaat ataupun langsung tiada memberi apa-apa manfaat kepada anda. Segala maklumat yang diperolehi daripada penyelidikan ini akan dapat membantu dalam penambahbaikan penentuan kesihatan di dalam komuniti anda.

6. Siapakah yang membiayai penyelidikan ini?

Kajian ini ditaja sepenuhnya oleh pihak penyelidik yang akan membayar semua produk penyelidikan dan prosedur yang berkaitan. Mana-mana prosedur dan rawatan lain yang tidak diperlukan dalam penyelidikan ini tetapi merupakan sebahagian daripada rawatan harian anda, adalah tanggungan anda sendiri ataupun pihak insurans anda.

8. Bolehkah penyelidikan ataupun penyertaan saya ditamatkan lebih awal daripada yang dirancang?

Doktor penyelidikan atau penaja boleh menamatkan penyelidikan ini ataupun menamatkan penyertaan anda dalam penyelidikan ini pada bila-bila masa, jika ia perlu demi keselamatan anda. Jika penyelidikan ini dihentikan terlebih awal, di atas sebab-sebab tertentu, anda akan dimaklumkan.

9. Adakah maklumat perubatan saya akan dirahsiakan ?

Segala maklumat anda yang diperolehi dalam penyelidikan ini akan disimpan dan dikendalikan secara sulit, bersesuaian dengan peraturan-peraturan dan/ atau undang-undang yang berkenaan. Kami tidak akan berkongsi maklumat mengenai anda kepada sesiapa di luar pasukan penyelidikan. Maklumat yang kami kumpulkan dari kajian penyelidikan ini akan disimpan secara peribadi. Sebarang maklumat tentang anda akan mempunyai nombor di atasnya bukan nama anda. Hanya penyelidik yang tahu nombor anda dan kami akan mengunci maklumat tersebut dengan di tempat berkunci.

Sekiranya hasil penyelidikan ini diterbitkan atau dibentangkan kepada orang ramai, identiti anda tidak akan didedahkan tanpa kebenaran anda terlebih dahulu. Pihak-pihak tertentu seperti individu yang terlibat dalam penyelidikan dan rawatan perubatan anda, juruaudit dan jurupantau yang terlatih, pihak penaja atau pihak gabungannya, pihak berkuasa kerajaan atau undang-undang, boleh memeriksa dan membuat salinan laporan perubatan anda jika berkenaan dan diperlukan.

Anda tidak akan dimaklumkan mengenai penemuan kajian. Anda akan dimaklumkan jika maklumat baru tersedia berkaitan dengan persetujuan kajian.

10. Pembayaran Balik

Anda tidak akan diberikan apa-apa insentif untuk mengambil bahagian dalam penyelidikan.

11. Siapakah yang perlu saya hubungi sekiranya saya mempunyai sebarang pertanyaan?

Anda boleh menghubungi doktor penyelidikan ini PROF. MADYA DR. MOHD DZULKHAIRI BIN MOHD RANI pada sambungan telefon 03-42892400/019-9353965 sekiranya anda mempunyai sebarang pertanyaan mengenai penyelidikan ini atau jika anda mengesyaki anda mengalami kecederaan yang terhasil daripada penyelidikan ini dan anda mahukan maklumat tentang rawatannya.

Jika anda mempunyai sebarang pertanyaan berkaitan dengan hak-hak anda sebagai peserta dalam penyelidikan ini, sila hubungi: Setiausaha, Jawatankuasa Etika & Penyelidikan Perubatan, Kementerian Kesihatan Malaysia, melalui talian telefon 03-2287 4032.

Appendix 14: Consent Form (Qualitative Research)

**BORANG PERSETUJUAN/ KEIZINAN PESERTA:
SUB-KAJIAN KUALITATIF**

Tajuk Penyelidikan :

Prevalen, Pengetahuan, Sikap dan Amalan tentang Penyakit Tidak Berjangkit (NCD) dan Penentu Kesihatan di kalangan Orang Asli Dewasa di Jelebu, Negeri Sembilan

Dengan menandatangani di bawah, saya mengesahkan bahawa :

1. Saya telah diberi maklumat tentang penyelidikan di atas secara lisan dan bertulis dan saya telah membaca dan memahami segala maklumat yang diberikan dalam risalah ini.
2. Saya telah diberikan masa yang secukupnya untuk mempertimbangkan penyertaan saya dalam penyelidikan ini dan telah diberi peluang untuk bertanyakansoalan dan semua persoalan saya telah dijawab dengan sempurna dan memuaskan.
3. Saya juga faham bahawa penyertaan saya adalah secara sukarela dan pada bila-bila masa saya bebas menarik diri daripada penyelidikan ini tanpa harus memberi sebarang alasan dan ianya sama sekali tidak akan menjejaskan rawatan perubatan saya pada masa akan datang.
4. Saya tidak mengambil bahagian dalam mana-mana penyelidikan lain pada masa ini. Saya juga memahami tentang risiko dan manfaat penyelidikan ini dan saya secara sukarela memberi persetujuan untuk menyertai penyelidikan ini di bawah syarat-syarat yang telah dinyatakan di atas. Saya faham saya harus mematuhi nasihat dan arahan yang berkaitan dengan penyertaan saya dalam penyelidikan ini daripada doktor penyelidikan (penyelidik) .
5. Saya faham bahawa kakitangan penyelidikan, pemantau dan juruaudit terlatih, pihak penaja atau gabungannya, dan pihak berkuasa kerajaan atau undang-undang, mempunyai akses langsung dan boleh menyemak laporan perubatan saya bagi memastikan penyelidikan ini dijalankan dengan betul dan data direkodkan dengan betul. Segala maklumat dan data peribadi akan dianggap sebagai SULIT.
6. Saya akan menerima satu salinan 'Risalah Maklumat Peserta dan Borang Persetujuan atau Keizinan Peserta' yang telah lengkap dengan tarikh dan tandatangan untuk dibawa pulang ke rumah.

Saya bersetuju/ tidak bersetuju* untuk doktor yang merawat keluarga saya diberitahu tentang penyertaan saya dalam penyelidikan ini. (*Potong mana yang tidak berkenaan)

Subjek :

Tandatangan:
Nama:

Nombor K/P:
Tarikh:

Penyelidik yang mengendalikan proses menandatangani borang keizinan:

Tandatangan:
Nama:

Nombor K/P:
Tarikh:

Saksi tidak berpihak/adil: (Diperlukan; jika subjek adalah buta huruf dan kandungan risalah maklumat peserta disampaikan secara lisan kepada subjek)

Tandatangan:
Nama:

Nombor K/P:
Tarikh:

Appendix 15: Letter from the Director General of MOH to the Chief Investigator



**KETUA PENGARAH KESIHATAN MALAYSIA
DIRECTOR GENERAL OF HEALTH MALAYSIA**

Kementerian Kesihatan Malaysia
Aras 12, Blok E7, Kompleks E,
Pusat Pentadbiran Kerajaan Persekutuan
62590 PUTRAJAYA

Tel.: 03-8883 2545
Faks: 03-8889 5542
Email: anhisham@moh.gov.my

Rujukan Kami : (40) dlm IKU/502/010 Jld 2

Rujukan Tuan : USIM/BANKRAKYAT_K1/

FPSK/052002/42117

Tarikh : 25 April 2019

YBrs. Prof. Madya Dr. Mohd Dzukhairi Mohd Rani
Ketua Penyelidik,
Fakulti Perubatan dan Sains Kesihatan
Universiti Sains Islam Malaysia

YBrs. Prof,

**MEMOHON KEBENARAN BAGI MENGGUNAKAN DATA NATIONAL HEALTH
AND MORBIDITY SURVEY (NHMS) 2015 UNTUK TUJUAN ULASAN LITERATUR
DAN PERBANDINGAN DATA DENGAN KAJIAN YANG AKAN DIJALANKAN**

Dengan hormatnya saya merujuk kepada perkara di atas dan surat yang berkaitan daripada pihak tuan bertarikh 2 April 2019.

2. Merujuk kepada permohonan tuan untuk mendapatkan data *National Health Morbidity Survey (NHMS) 2015* untuk tujuan ulasan literatur dan perbandingan data dengan kajian yang akan dijalankan bertajuk *Prevalence, Knowledge, Attitude and Practice on Non-Communicable Diseases (NCDs) and Health Determinants Among Adults Orang Asli in Jelebu, Negeri Sembilan*, pihak Kementerian Kesihatan Malaysia (KKM) tidak dapat membekalkan data tersebut kerana rekabentuk NHMS tidak dapat mewakili penduduk Orang Asli di Malaysia atau negeri.

3. Sekiranya ada pertanyaan lanjut, tuan boleh berhubung terus dengan Pengarah Institut Kesihatan Umum, Dr. Tahir bin Aris di talian 03-33628700 atau tahir.a@moh.gov.my

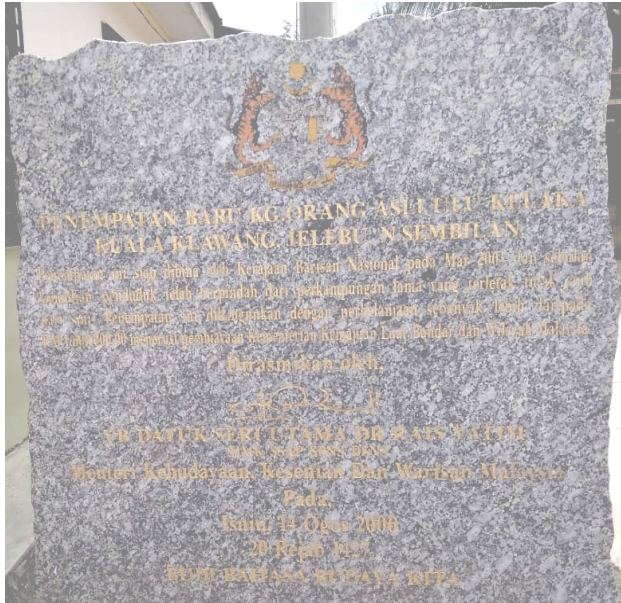
Terima kasih.

Saya yang menjalankan amanah,

(DATUK DR. NOOR HISHAM BIN ABDULLAH)

s.k.
Timbalan Ketua Pengarah Kesihatan (P&ST)
Pengarh Institut Kesihatan Umum

Appendix 16: Qualitative Study Site



Photograph 2 : History of the Kampung Orang Asli Ulu Kelaka settlement

(Photograph by the researcher)



Photograph 3: The premix road connecting Kampung Ulu Kelaka with the main road, Jalan Kuala Klawang-Seremban

(Photograph by the researcher)



Photograph 4: Premix road connecting the housing area in the village

(Photograph by the researcher)



Photograph 5: Outdoor electric substation located in the Kg Orang Asli Ulu Kelaka managed by Tenaga Nasional Berhad (TNB)

(Photograph by the researcher)



Photograph 6: Taman Bimbingan Kanak-Kanak (TABIKA) providing early childhood education for children aged 4 to 6-years-olds located in the Kg Orang Asli Ulu Kelaka

(Photograph by the researcher)



Photograph 7: The community hall of Kampung Orang Asli Ulu Kelaka

(Photograph by the researcher)



Photograph 8: The badminton court referred to as field by local villages, located next to the community hall

(Photograph by the researcher)



Photograph 9: Villagers receiving monthly health visit from the Jelebu Health District Office

(Photograph by the researcher assistant)



Photograph 10: Children walking barefoot around the village without wearing shoes or slippers

(Photograph by the researcher)



Photograph 11: Children playing barefoot at the small stage in front of the badminton courts

(Photograph by the researcher)



Photograph 12: The surroundings of the villagers' houses indicated improper waste disposal

(Photograph by the researcher)



Photograph 13: Waste disposed behind the housing area, as seen at the roadside of the village

(Photograph by the researcher)



Photograph 14: In-depth interview session conducted with one of the respondents in the community hall

(Photograph by the researcher assistant)



Photograph 15: Respondent receiving a token of appreciation after participating in the in-depth interview session

(Photograph by the researcher)



Photograph 16: (From right to left) The committee member of the research, Dr Nadeeya 'Ayn Umaisara, En. Faizal, the Chairman of MPKK chairman, and Tok Abeng, the Tok Batin of Kampung Orang Asli Ulu Kelaka, Kuala Klawang.

(Photograph by the researcher)

Appendix 17: List of Conference Proceedings

- 1) Wan Nur Alwani Wan Abd. Aziz, Wan Mohamad Nasir Wan Othman , Haslinda Ramli, Mohd Dzulkhairi Mohd Rani, Wan Nor Syariza Wan Ali, Muslimah Ithnin.
"A Preliminary Study of Self-Perceived Oral Health of Villagers in an Urban District in Malaysia."
25th Malaysian Dental Association (MDA) Scientific Convention and Trade Exhibition. Putra World Trade Centre, Kuala Lumpur. 26-28 January 2018.
Oral Presentation and Abstract in Conference Magazine: p.30
- 2) Wan Nor Syariza Wan Ali, Wan Mohamad Nasir Wan Othman, Wan Nur Alwani Wan Abd. Aziz, Haslinda Ramli, Mohd Dzulkhairi Mohd Rani, Muslimah Ithnin.
"Oral Health-Related Quality of Life of Villagers in a Semi-urban District in Malaysia."
4th Putrajaya International Conference on Children, Women, Elderly and People with Disabilities 2018 (PiCCWED 4), Hotel Bangi-Putrajaya, Bandar Baru Bangi, 24 - 25 February 2018.
Oral Presentation and Abstract in Conference Magazine.
- 3) Muslimah Ithnin, Wan Mohamad Nasir, Wan Nor Syariza Wan Ali, Wan Nur Alwani Wan Abdul Aziz, Haslinda Ramli, Mohd Dzulkhairi Mohd Rani.
"Hubungan di antara Kualiti Hidup Berkaitan Kesihatan Pergigian di kalangan Orang Asli di Jelebu, Negeri Sembilan."
Sustainable Education for Indigenous People Seminar (SEIPS) 2018. D'Sora Boutique Hotel, Sendayan. 20 April 2018.
Oral Presentation and Abstract in Conference Magazine.
- 4) Muslimah Ithnin, Norsham Juliana Nordin, Mohd Azmani Sahar, Nadia Mohd Effendy, Nadeeya Ayn' Umaisara, Khadijah Hasanah Abang Abdullah, Mohd Shamsir Mohd Aris, Mohd Dzulkhairi Mohd Rani.
"Knowledge, Attitude and Practice of Non-communicable Diseases (NCDs) among Urban Residents in Negeri Sembilan."
9th National Public Health Conference, Royale Chulan Seremban, Negeri Sembilan. 15-18 July 2018.
Oral Presentation and Abstract in Malaysian Journal of Public Health Medicine. Vol. 18 (supp 2): p.22.
- 5) Mohd Dzulkhairi Mohd Rani, Muslimah Ithnin, Norsham Juliana Nordin, Nadeeya Ayn' Umaisara, Mohd Azmani Sahar, Nadia Mohd Effendy, Khadijah Hasanah Abang Abdullah, Mohd Shamsir Mohd Aris.
"The Prevalence of Non-communicable Diseases (NCDs) and Associated Risks Factors among Adults in Ampangan, Negeri Sembilan."
9th National Public Health Conference, Royale Chulan Seremban, Negeri Sembilan. 15-18 July 2018.
Oral Presentation and Abstract in Malaysian Journal of Public Health Medicine. Vol. 18 (supp 2): p.22-23.

- 6) **Muslimah Ithnin**, Mohd Dzulkhairi Mohd Rani, Norsham Juliana Nordin, Nadeeya Ayn' Umairasa, Mohd Azmani Sahar, Nadia Mohd Effendy, Khadijah Hasanah Abang Abdullah, Mohd Shamsir Mohd Aris.
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- 9) **Muslimah Ithnin**, Mohd Dzulkhairi Mohd Rani, Norsham Juliana Nordin, Nadeeya Ayn' Umairasa, Nadia Mohd Effendy, Mohd Azmani Sahar, Khadijah Hasanah Abang Abdullah, Mohd Shamsir Mohd Aris.
 "Are They Getting Fatter and Rounder? ← A Cross-Sectional Study Among Adult Orang Asli in Jelebu, Negeri Sembilan."
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 Oral Presentation and Abstract in Conference Magazine: p.4
- 10) **Muslimah Ithnin**, Norsham Juliana, Nadeeya 'Ayn Umairasa Mohamad Nor, Nadia Mohd Effendy & Mohd Dzulkhairi Mohd Rani.
 "Behavioural Risk Factors of Non-communicable Diseases (NCDs) Determinant in the Context of an Orang Asli (Indigenous peoples): A Qualitative Study"
 4th UUM International Qualitative Research Conference (QRC 2020). 2-3 December 2020. Oral Presentation and Abstract in Conference Magazine: p.19

Appendix 18: List of Publications

1. **Ithnin, M.**, N. A. U. M. Nor, N. Juliana, N. M. Effendy, M. A. Sahar, K. H. A. Abdullah, M. S. M. Aris & M. D. M. Rani. 2018. "Knowledge, Attitude, and Practice on Non-Communicable Diseases (NCDs) among the Adult Population in the Urban Area of Negeri Sembilan, Malaysia". *International Journal of Research in Pharmaceutical Sciences*. Vol. 9. (SPL 2): p. 88-94.
2. Wan Ali, W. N. S., W.N.S Wan Othman, W. N. A. Wan Abdul Aziz, H. Ramli, M. D. Mohd Rani & **M. Ithnin**. 2018. "Oral Health-Related Quality Of Life of Villagers in a Semi-urban District in Malaysia". *International Journal for Studies on Children, Women, Elderly And Disabled*. Vol. 4: p.132-139
3. Rahman, T. S. A., K. Anuar, M. D. M. Rani, A. Syaiful, **M. Ithnin**, M. K. N. Z. Nasri, A.A. Rahman, M.R.A. Rashid, F.H. Addnan and & K. N. N. Afipin. 2019. "A scientometric analysis of studies on the Effects of the Date palm (Phoenix dactylifera) Fruit on Human Health". *Malaysian Journal of Science Health and Technology*. Vol. 3(1): p. 2601-0003.
4. Rani, M. D. M., **M. Ithnin**, N. A. U. M. Nor, N. Juliana, N. M. Effendy, S. Azmani, K. H. A. Abdullah, M. S. M. Aris & I. F. Abu. 2019. "Comparison of Health-Seeking Behaviour between Urban and Rural Malay Population of Negeri Sembilan, Malaysia". *International Journal of Research in Pharmaceutical Sciences*. Vol. 10. (4): p. 3608-3615.
5. **Ithnin, M.**, N. A. U. Mohamad Nor, N. Juliana, N. Mohd Effendy, M. A. Sahar, K. H. Abang Abdullah, M. S. Mohd Aris & M. D. Mohd Rani. 2020. "Knowledge, Attitudes and Practices on Risk Factors of Non-Communicable Diseases (NCDs): A Cross-Sectional Survey among Urban and Rural Adults in Negeri Sembilan, Malaysia". *International Journal of Health Promotion and Education*. Vol. 58. p. 1-11.
6. **Ithnin, M.**, N. A. U. M. Nor, N. Juliana, N. M. Effendy, M. A. Sahar, K. H. A. Abdullah, M. S. M. Aris & M. D. M. Rani. 2020. "Knowledge, Attitude and Practices Towards Lifestyle Related Non-Communicable Diseases (NCDs): A Cross Sectional Study among Indigenous Orang Asli Adults in Negeri Sembilan, Malaysia". *IIUM Medical Journal Malaysia*. Vol. 19. (2): p. 75-82.
7. **Ithnin, M.**, N. Juliana, N. A. U. M. Nor, N. M. Effendy, & M. D. M. Rani. 2020 "Knowledge, Attitude, and Practices of Non-Communicable Diseases: Comparison between Orang Asli and Malay from Rural Area in Negeri Sembilan, Malaysia: A Comparative Study". *Malaysian Journal of Public Health Medicine*. Vol. 20. (2): p. 131-140.
8. **Ithnin, M.**, N. Juliana, N. A. U. M. Nor, N. M. Effendy, & M. D. M. Rani. 2020 "Behavioural Risk Factors of Non-communicable Diseases (NCDs) Determinant in the Context of an Orang Asli (Indigenous peoples): A Qualitative Study" Proceedings of the 4th UUM International Qualitative

Research Conference (QRC) 2020. ISBN: 978-967-2276-33-3.eISBN: 978-967-2276-34-0. p.111-122.

9. **Muslimah Ithnin**, Khairun Nain Nor Aripin, Nadia Mohd Effendy, Norsham Juliana, Nadeeya 'Ayn Umaisara Mohamad Nor & Mohd Dzulkhairi Mohd Rani. "Metabolic Syndrome among Indigenous People (Orang Asli) in Peninsular Malaysia: A Systematic Review." (Manuscript accepted for publication at ASM Science Journal on June 5, 2020)
10. Othman WN, **Ithnin M**, Wan Ali WNS, Wan Abd Aziz WNA and Ramli H. "Oral Health-Related Quality Of Life Of Adult Orang Asli In Jelebu, Malaysia: A Cross-Sectional Study" (Manuscript accepted for publication at Journal of International Society of Preventive and Community Dentistry on December 8, 2020)
11. **Muslimah Ithnin**, Khairun Nain Nor Aripin, Nadia Mohd Effendy, Norsham Juliana, Nadeeya 'Ayn Umaisara Mohamad Nor & Mohd Dzulkhairi Mohd Rani. "Non-Communicable Diseases Behavioural Risk Factors among Adults Orang Asli In Malaysia: A Systematic Reviews" (Manuscript submitted to Sains Malaysiana on Januari 31, 2020)
12. **Muslimah Ithnin**, Nadeeya 'Ayn Umaisara Mohamad Nor, Norsham Juliana, Nadia Mohd Effendy, Mohd Azmani Sahar, Khadijah Hasanah Abang Abdullah, Muhammad Shamsir Mohd Aris & Mohd Dzulkhairi Mohd Rani. "The Burden of Major Non-Communicable Diseases and Their Risk Factors among Adult Orang Asli (Indigenous People) in Jelebu, Negeri Sembilan Malaysia: A Cross-sectional Study" (Manuscript submitted to Asia Pacific Family Medicine on May 4, 2020)
13. **Muslimah Ithnin**, Nadeeya 'Ayn Umaisara Mohamad Nor, Norsham Juliana, Nadia Mohd Effendy & Mohd Dzulkhairi Mohd Rani. "Health Seeking Behaviour among Adult Orang Asli (Indigenous Peoples) from Rural Negeri Sembilan, Malaysia: A Mixed-Methods Study". (Manuscript submitted to Science Progress on July 7, 2020)

ORAL HEALTH-RELATED QUALITY OF LIFE OF VILLAGERS IN A SEMI-URBAN DISTRICT IN MALAYSIA

Wan Nor Syarifzati binti Wan Ali
Wan Mohamad Nasir bin Wan Othman
Wan Nur Alwani binti Wan Abdul Aziz
Haslinda binti Ramli
Mohd Dzulkhairi bin Mohd Rani
Muslimah bt. Ithnin

ABSTRACT

Oral health is essential to general health. It influences the quality of life of an individual. Oral health-related quality of life (OHRQoL) is the impact of oral disease or conditions in the oral cavity on functional, psychosocial and pain, and discomfort. The objective of this study was to investigate OHRQoL of villagers in a semi-urban district in Malaysia in relation to diabetes mellitus, hypertension and overweight or obesity using the validated Malay version of the General Oral Health Assessment Index (GOHAI-Malay). A cross-sectional study was conducted using a stratified two-stage sampling method. Participants were asked to rate their oral health status. They were then interviewed by using the validated GOHAI-Malay questionnaire. The data were tested for normality using Shapiro-Wilks test. Subsequently, Mann-Whitney and Kruskal-Wallis statistical tests were used to determine the level of significance set at $p < 0.05$. A total of two hundred participants from 11 villages were interviewed. The age of the participants was between 18 to 89 years old with mean age of 55.3 (± 16.5) years total of 56.5% were females and 13.5% had tertiary education. The mean GOHAI score was 53 (± 7.4) which ranged from 30 to 60. It was found that 47.5% of the participants showed good quality of life (QOL), 24.0% fair and 28.5% poor. The GOHAI score was statistically significant according to age groups ($p < 0.001$), level of education ($p < 0.001$) and hypertension ($p < 0.003$). The OHRQoL was inversely related to age. Participants with higher educational level indicated better OHRQoL. Participants with hypertension as an underlying health condition appeared to have lower perception OHRQoL. These findings provide the input in designing intervention activities involving medical and dental practitioners improve OHRQoL among villagers with hypertension.

Key words: GOHAI, quality of life, OHRQoL, hypertension, elders

INTRODUCTION

Oral health and general health should not be seen as two separate entities of the body (Sheiham, 2005). Ill-health in any part of the body affects the person as an individual and members of the family and community. Pain and discomfort due to oral disease may lead to loss of work time or school days. Change in the type of food people eat may affect their oral health as well as general health such as obesity, diabetes mellitus and cardiovascular diseases. Problems in their speech hinders them from communicating with others. The conditions of their oral health influence their self-esteem and restrict them from socialising. Diseases of the oral cavity such as dental caries, periodontal disease and oral cancer influence other chronic diseases. Some of the signs and symptoms of chronic diseases are also evident in the oral cavity.

Oral diseases, such as dental caries and periodontal disease affect a large proportion of people throughout the world. The Global Burden of Disease study indicated that dental caries was the most prevalent condition whilst periodontal disease was the 4th most prevalent condition (Richard, 2013). Nevertheless, oral diseases and conditions receive less attention from the public because it is rarely life threatening. The impact of the disease on an individual's daily life and general health are also communicated to the public in terms of impaired quality of life such as inability to eat, sleep and socialise due to associated pain and discomfort.

Oral diseases and conditions are often measured clinically from the perspective of practitioners based on objective measures using dental indices. However, these indices only measure the end-point of the disease without considering the impact of disease from the individual's perspective (Nuca, 2007). Therefore, in recognition to the importance in the relationship between general health and oral health, there is increasing interest to shift from merely focusing on the disease in the oral cavity to patient or individual in a holistic manner (Higginson and Carr, 2001). This led to the development of Oral Health-Related Quality of Life (OHRQoL) measures. These are instruments to ascertain the perceptions by individuals on the functional, social, psychological impacts of oral diseases (Gift, Atchison & Dayton, 1997) or conditions in the oral cavity that affect them.

Most of the studies to assess OHRQoL were conducted in relation to oral disease and conditions such as dental caries, periodontal disease and edentulousness. There were also very few such studies conducted in the primary 5 countries. Similarly, researchers worldwide attempted to look into the relationship of OHRQoL among people with chronic diseases and conditions such as diabetes mellitus, hypertension and cognitive conditions. Even then, these studies were conducted to assess relations between OHRQoL and specific disease. To our knowledge, there were no studies conducted on the relationship between OHRQoL and all the three (3) major systemic diseases and condition namely hypertension, diabetes mellitus and obesity in

community. These diseases are prevalent in Malaysia and shared a common risk factor that is sugar. A review by Tee and Yap (2017) indicated that the prevalence of diabetes mellitus in Malaysia in 2015 was 17.5%, almost doubled the prevalence in 1966. It was also found that in 2015, there were 47.7% adults with the problem of either overweight or obesity. There was also an increase of hypertension among adults aged ≥ 30 years from 32.9% in 1996 to 43.5% in 2011.

The two most frequently used OHRQoL measures of impact of oral conditions on daily functioning are the short version of Oral Health Impact Profile (OHIP) and the General Oral Health Assessment Index (GOHAI). Nevertheless, GOHAI is considered for this study as it is more effective than OHIP (short version) at detecting the oral function problems due to oral diseases. It was also shown to be sensitive to the provision of oral health care with regard to functional and psychosocial impacts (Locker et al., 2001).

It was found that the responses to GOHAI items on certain oral condition are dependent on cultural background. Presence or absence of health problems have different connotation of importance in different cultures. Therefore, it is important that the GOHAI be assessed in various communities and countries due to cross-cultural differences. The objective of this study was to investigate OHRQoL of villagers in a semi-urban district in Malaysia in relation to diabetes mellitus, hypertension and Body Mass Index using the validated Malay version of General Oral Health Assessment Index (GOHAI-Malay).

This paper emphasised on oral health and general health interface and the rationale for using OHRQoL measures in relation to chronic diseases and conditions. This is preceded with description of the data collection method using the validated multiple-item GOHAI-Malay questionnaire and the single-item self-rated assessment. The sample size, the selection of the participants from the semi-urban villages and statistical analysis are also described. The result of the study is presented according to the demographic profile of the participants, their general diseases and conditions and the corresponding GOHAI scores. A summary of the responses to each item of the questionnaire are presented in the form of numbers and percentages. Finally, the salient points are discussed and the conclusion is presented.

METHODOLOGY

This study was part of the overall *Kampung Mizan* project, that is the development of a harmonious dwelling of local villages currently conducted by the Universiti Sains Islam Malaysia.

It was a cross-sectional study on villagers from a semi-urban district in Malaysia using a stratified two-stage sampling method to identify the villages whilst selection of the participants in these villages was based on convenience sampling.

The calculation of sample size adopted the test-retest reliability approach. The assumed expected GOHAI r was 0.8 ($H_{1-p} = 0.7$ and $H_{1-a} = 0.5$). A two-sided test as suggested by Walter et al. (1998) was used with $\beta = 0.1$ (90% power) and $\alpha = 0.05$. This resulted in a reduced sample size of 162 participants. The sample size was increased to 194 to cater for 20% dropout. The participants were asked to rate their oral health by indicating either as excellent, very good, good, average or poor. This was followed with assessment of OHRQoL using the validated GOHAI-Malay questionnaire (Othman, et al., 2006).

Participants were interviewed by a trained personnel using this instrument, taking into consideration their socio-demographic characteristics (sex, age and educational status), presence of non-communicable diseases (hypertension and diabetes mellitus) and overweight or obesity based on their Body Mass Index (BMI).

This study adopted the definitions of diabetes mellitus and hypertension used in the National Health and Morbidity Survey 2015. Diabetes mellitus and hypertension were defined as self-reported of being told to have diabetes mellitus or hypertension by a doctor or assistant medical officer (AMO) (Institute of Public Health, 2015). The BMI was determined by weight in kg divided by square of height in metres. It was dichotomised into < 25 and ≥ 25 as the cut-off point for overweight.

The GOHAI questionnaire consisted of 12 items. It was used to assess oral health-related problems from three dimensions: physical function (concern about eating, speech and swallowing), psychosocial function (concern about oral health, self-image, self-consciousness regarding health and avoidance of social contact due to oral health problems) and pain or discomfort (Atchison & Dolan, 1990).

The response options for the questionnaire was based on the experiences of the participants for the past three months. A 5-point Likert scale of 1 (always); 2 (often); 3 (sometimes); 4 (seldom); and 5 (never) was used. For the purpose of analyses, the scoring for items 3, 5 and 7 were reversed to harmonise with other statements that were formulated in the negative form. The final score for each participant ranged from the minimum score of 12 to the maximum score of 60. The higher score reflects better self-perceived oral health related quality of life, or negative impact on the quality of life. The final score for each individual were categorised as good (score 57-60), fair (score 51-55) or poor (score 50 or less).

The data were tested for normality using Shapiro-Wilks test. It was found that the GOHAI score was not normally distributed. Therefore, Mann-Whitney and Kruskal-Wallis statistical tests were used to determine level of significance of the variables which was set at $p < 0.05$.

Ethical approval was obtained from the Medical Ethics Committee of the Faculty of Dentistry, Universiti Sains Islam Malaysia (USIM/FPg-MEC/2016/No(17)). Written informed consent were obtained from participants before the interview.

RESULT

A total of two-hundred (200) residents from four villages were interviewed. The mean age of the participants was 55.3 (±1) and ranged from between 18 to 89 years old.

The proportion of female to male was 56.5% and 43.5% respectively, whilst 13.5% of participants had tertiary education and had no formal education. The socio-demographic profile of the participants and their GOHAI scores are shown in Table 1.

The mean GOHAI score was 53.66 (±7.4) and ranged from 30 to 60. When the GOHAI scores were categorised according level of oral health-related quality of life (OHRQoL), it was found that 95 (47.5%) participants had good OHRQoL, 48 (24.2%) as moderate OHRQoL and 57 (28.5%) as poor OHRQoL.

The GOHAI score was statistically significant between the age groups ($p < 0.001$). It was inversely related to age, that is higher age groups were found to have lower GOHAI scores. The GOHAI score was also statistically significant between level of education ($p < 0.001$), that is those with higher level of education were found to have higher GOHAI scores.

Table 1: Socio-demographic Profile of Participants and GOHAI Score

Variables	n (%)	Mean GOHAI Score	Median (IQR)	p-value
Gender				
Male	87 (43.5)	52.6 (±7.7)	54 (12)	Mann-Whitney U $p=0.083$
Female	113 (56.5)	55.7 (±7.1)	57 (9)	
Age				
15-19	3 (1.5)	56 (±6.9)	60 (0)	Kruskal Wallis $p < 0.001$ (Statistically significant)
20-24	7 (3.5)	60 (±0.0)	60 (0)	
25-29	5 (2.5)	58.6 (±2.2)	60 (4)	
30-34	11 (5.5)	57.7 (±2.9)	58 (4)	
35-44	31 (15.5)	54.4 (±8.2)	60 (11)	
45-54	34 (17.0)	53.9 (±7.6)	57 (9)	
55-64	40 (20.0)	54.8 (±5.5)	56 (9)	
65-75	38 (18.0)	50.4 (±8.2)	51 (12)	
75+	31 (15.5)	51.3 (±7.8)	52 (12)	
Educational Level				
No formal education	11 (5.5)	50.7 (±7.4)	51 (15)	Kruskal Wallis $p < 0.001$ (Statistically significant)
Primary school	61 (30.5)	50.9 (±12.0)	51 (12)	
Secondary School	101 (50.5)	54.4 (±7.1)	57 (8)	
Tertiary education	27 (13.5)	57.9 (±4.0)	60 (6)	

The level of OHRQoL was also measured against underlying medical conditions in particular diabetes mellitus, hypertension, overweight or obesity, measured using Body Mass Index as shown in Table 2.

The GOHAI score was found to be statistically significant with those who reported to be diagnosed of hypertension ($p < 0.01$). However, the GOHAI scores were not statistically significant when comparison was made between those who reported to have diabetes mellitus and those without. Similarly, when the participants with BMI < 25 were compared with BMI ≥ 25 , there were no differences in GOHAI scores was not statistically significant.

Table 2: GOHAI Score and Underlying Medical Conditions

Independent Variable	n (%)	Mean GOHAI Score	Median (IQR)	p-value
Diabetes mellitus				
No	171 (85.5)	54.0 (±7.1)	56 (11)	$p=0.210$
Yes	29 (14.5)	51.8 (±8.7)	54 (15)	
Hypertension				
No	126 (63.0)	54.7 (±7.1)	58 (9)	Mann-Whitney U $p=0.003$ (Statistically significant)
Yes	74 (37.0)	51.9 (±13.0)	53 (13)	
Body Mass Index (BMI)				
< 25	85 (42.5)	53.4 (±6.9)	54 (12)	$p=0.369$
≥ 25	115 (57.5)	53.9 (±7.8)	57 (10)	

When the participants were asked to rate their oral health status, 20 (10.0%) rated their oral health as excellent, 33 (16.5%) as very good, 69 (34.5%) as good, 36 (18%) as fair and 42 (21.0%) rated as poor. This is presented in Table 3. The participants' perception of their overall oral health condition was found to be related with their OHRQoL whereby participants with poor oral health status had presented with low OHRQoL score ($p < 0.001$).

Table 3: Self-rated Oral Health Status

Oral Health status	n (%)	Mean GOHAI Score	Median (IQR)	p-value
Poor	42 (21.0)	46.36 (9.336)	48 (16)	Kruskal Wallis $p < 0.001$ (Statistically significant)
Fair	36 (18.0)	51.64 (6.005)	52 (10)	
Good	69 (34.5)	56.13 (4.595)	58 (7)	
Very good	33 (16.5)	57.36 (4.595)	60 (4)	
Excellent	20 (10.0)	58.00 (4.168)	60 (2)	

The responses of the participants on all the twelve items in the questionnaire were also taken into consideration in order to determine the factors that influence the OHRQoL. These responses are presented in Table 4. Most of the participants responded to the twelve (12) GOHAI questionnaire as "never" or "seldom". This indicated that their quality of life in terms of physical function, pain and discomfort, and psychological impacts was good. This was consistent with the self-rated responses on their oral health status. The common problems faced among 17.5% to 20.5% of the participants was the trouble in biting/chewing the food and so they had to limit the kind of food they take.

Table 4: Responses of Participants on GOHAI Items

	Never (5) n (%)	Seldom (4) n (%)	Sometimes (3) n (%)	Often (2) n (%)	Always (1) n (%)
In the past three months:					
Physical function					
Limit the kind of food (1)	110 (55.0)	37 (18.5)	18 (9.0)	28 (14.0)	7 (3.5)
Trouble biting/chewing (2)	108 (54.0)	36 (18.0)	15 (7.5)	24 (12.0)	17 (8.5)
Trouble swallowing (3)	134 (67.0)	45 (22.5)	7 (3.5)	8 (4.0)	6 (3.0)
Unable to speak clearly (4)	143 (72.5)	47 (23.5)	0 (0)	7 (3.5)	3 (1.5)
Pain and Discomfort					
Discomfort when eating (5)	119 (59.5)	43 (21.5)	8 (4.0)	15 (7.5)	15 (7.5)
Medications for pain (8)	164 (82.0)	24 (12.0)	4 (2.0)	3 (1.5)	5 (2.5)
Sensitive teeth (12)	167 (83.5)	21 (10.5)	10 (5.0)	2 (1.0)	0 (0)
Psychosocial impacts					
Limit contacts with others (6)	147 (73.5)	44 (22.0)	5 (2.5)	4 (2.0)	0 (0)
Unhappy with appearance (7)	121 (60.5)	43 (21.5)	16 (8.0)	11 (5.5)	9 (4.5)
Worried or concerned (9)	150 (75.0)	30 (15.0)	10 (5.0)	7 (3.5)	3 (1.5)
Nervous, self-conscious (10)	159 (79.5)	28 (14.0)	7 (3.5)	2 (1.0)	1 (0.5)
Uncomfortable eating in front of others (11)	157 (78.5)	29 (14.5)	8 (4.0)	5 (2.5)	1 (0.5)

DISCUSSION

This study was an attempt to examine the oral health related quality of life of participants from four (4) villages in a semi-urban district in Malaysia based on the demographic characteristics such as, gender, age and educational level as well as systemic diseases and condition, that include diabetes mellitus, hypertension and overweight or obese.

The total number of participants was 200 and this was more than the number of the sample required which was 162. This indicated the overwhelming response from the villagers who volunteered to participate in this study. The high response rate was because the interviewer was accompanied by a member of the community known to the villagers during the home visit. Therefore, rejection from participating in the study would affect their dignity and may subsequently affect their participation in the follow-up studies.

It was found that there was an inverse relationship between age and GOHAI score. This was consistent with other studies that showed statistically significant higher GOHAI scores and better OHRQoL among the younger age group (Tuber, Jeanmin et al 2003 and Kressin et al., 1997). It was explained that this was due to the narrow age group and inability of older age groups to adapt with oral hygiene practice (Denis et al., 2017).

The level of education status influences the GOHAI score (Motallebnejad, 2013). This is also consistent with our study where well-educated participants had higher GOHAI score. Similarly, after adjusting for age, sex, and pension status, Tsakos et al. (2009) also found a statistically significant gradient effect of educational level on GOHAI scores.

There was no significant difference ($p > 0.05$) of GOHAI scores between male and female participants in this study. John et al. (2004) indicated that oral health-related quality of life was not associated with socioeconomic or demographic factors. It was also concluded that demographic indicators were poor predictors of quality of life (Singh, et al., 2014).

Hypertension is considered a serious public health problem due to its chronic nature of the disease, high costs of hospitalisation, and a factor for early retirement and disability (de Carvalho, 2013). This study found significant relationship between the GOHAI score and hypertension. Trevisol et al., (2012) indicated that individuals with hypertension have lower quality of life, particularly when blood pressure is controlled by drug treatment. Hypertension itself does not result in manifestations in the oral cavity. However, the use of high blood pressure medications may result in side effects such as dry mouth (xerostomia), gingival hyperplasia, pain or swelling of the salivary glands, altered taste sensation and several other signs and symptoms (Guggenheimer, 2005). This has clinical significance to both dental and medical practitioners. Dentists are in an enviable position to detect cases of hypertension patients on medication in the dental clinic. They should be familiar with medications that could have the potential to adversely affect blood pressure control as well as commonly prescribed antihypertensive medications, their side effects, and drug interactions (Sutherland et al., 2016). They can institute necessary actions to control the side effects in the oral cavity. Medical practitioners should alert those on hypertensive drugs on its oral manifestations to avoid their patients from discontinuing the medication that may cause severe consequences to the person.

Diabetes mellitus is a chronic disease with several signs and symptoms that are manifested in the oral cavity. This include xerostomia, increased accumulation of plaque and calculus, periodontitis, periapical abscess and burning mouth syndrome (Newman et al., 2006). Our study found that participants who reported to have diabetes mellitus had high GOHAI scores indicating that the disease did not affect their quality of life. This finding was consistent with the study by Nishkin et al. (2014) who found that diabetic patients had poor oral health but their OHRQoL scores were high, indicating good quality of life. This implied that although diabetic patients had poor oral health, it did not significantly affect their oral health-related quality of life. In this respect, oral health status affected psychological aspects of OHRQoL rather than functional aspect (Sandberg et al., 2000) as reflected in the high GOHAI scores.

Inglehart and Bagramian (2002) identified three (3) methods in measuring OHRQoL namely social indicators, global self-rating (single item questionnaire) and socio-dental indicators (multiple items questionnaires). The first two methods were used in this study. The socio-dental indicator method assesses the effect of oral conditions at the community level such as days loss from work or school. It is not used in this study as it employs different methodology and sets of instruments.

The global self-rating is the simplest method of assessing self-perception of OHRQoL (Nuca, 2007 and Thomson, 2012). It is based on individual's response on their oral health to a single question. It also allows individuals to decide the oral health experiences that is more important on their quality of life (Inglehart & Bagramian, 2002). This study found that the majority of the participants indicated that their oral health was good. Other studies also revealed similar finding (Locker, 2005 and Ravaghi and Lee, 2012). On the other hand, there are also findings that are contrary to the present study (Kim & Patton, 2010). Therefore, findings on this aspect is equivocal.

The most widely used method to assess OHRQoL is the socio-dental indicators. This method uses multiple items questionnaires (Slade, 2002). The present study adopts the General Oral Health Assessment Index (GOHAI) as it was commonly used in clinical or epidemiological studies, sensitive to provision of oral health care and validated in many languages including Malay. The validated GOHAI-Malay questionnaire was used in this study. GOHAI was originally designed to determine the OHRQoL among the elderly. Other studies indicated that it could be used for other age groups and socio-demographic characteristics (Atchison & Gift, 1997). A distinguishing feature of this index is that most of the statements were in the negative form but there were three statements out of twelve that were worded in positive form. It was designed in such a manner to ensure the participants are more careful in filling up the questionnaire (Hebling and Pereira, 2007). Nevertheless, researchers have to be cognizance of this characteristic of the index and harmonise all the statements into the negative form for analysis. GOHAI provides an individual's perspectives of a health outcome that can complement clinical measures of oral health.

The use of both global self-rating and socio-indicator methods in this study was to check consistency of the results. It was found that finding of global self-rating as indicated by the participants was consistent with that of the overall GOHAI score for this community. Locker et al. (2005) also found that the global self-rating correlated with the social-indicator index that assessed the perception of individuals on how oral health affects daily activities.

CONCLUSION

This study exemplified the importance of oral health and general health relationship. The OHRQoL provides the linkage to this relationship and paved the way for the establishment of a holistic approach in assessment of health. It also supported the findings of other related studies that there are cross-cultural differences in OHRQoL even for similar diseases or conditions. Therefore, it is essential that the perception of an individual on his/her oral health status is taken into consideration in the assessment of health status.

This study indicated that most of the participants in this semi-urban district considered their oral health as good. However, the level of quality of life appeared to be inversely proportional to age but proportional to level of education. Those with hypertension indicated that they have lower OHRQoL than those without. This may be due to the hypertensive medications used to control the disease. There was no statistical difference in OHRQoL among participants who reported to suffer from diabetes mellitus. This is in spite of well documented reports that there are signs and symptoms of diabetes mellitus manifested in the oral cavity.

The findings of this study can be used to advocate development of a collaborative programme between dental and medical practitioners on enhancing the quality of life of hypertensive patients and increase compliance to the medication regime. Discontinuation of medication due to side effects manifested in the oral cavity and resulting in low OHRQoL may cause serious consequences to the patient.

A limitation of this study is that it adopted the cross-sectional study design. It would be useful to conduct a longitudinal study to assess the OHRQoL over time for individuals with or without underlying medical conditions in order to identify factors that influence OHRQoL. Another limitation of this study is that it adopted the approach of the National Health and Mobility Survey 2015 based on self-report of the participants in determining presence of diabetes mellitus and hypertension. Therefore, objective assessment of the disease levels could not be established and as a result, an intensive analysis of the relationship between these diseases and OHRQoL could not be carried out. Future studies need to address these methodological issues.

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Wan Nor Syariza binti Wan Ali
Faculty of Dentistry
Universiti Sains Islam Malaysia, 65000 Nilai, Malaysia
Email: wan_syariza@usim.edu.my

Wan Mohamad Nasir bin Wan Othman
Faculty of Dentistry
Universiti Sains Islam Malaysia, 65000 Nilai, Malaysia
Email: wan_nasir@usim.edu.my

Wan Nur Alwani binti Wan Abdul Aziz
Faculty of Dentistry
Universiti Sains Islam Malaysia, 65000 Nilai, Malaysia
Email: wan_nur@usim.edu.my

Hasbiyada binti Khamli
Faculty of Dentistry
Universiti Sains Islam Malaysia, 65000 Nilai, Malaysia
Email: drhasbiyada@usim.edu.my

Mohd Dzulkhairi bin Mohd Rani
Faculty of Medicine and Health Sciences
Universiti Sains Islam Malaysia, 65000 Nilai, Malaysia
Email: drdzulkhairi@usim.edu.my

Muslimah bt. Ithnin
Faculty of Medicine and Health Sciences
Universiti Sains Islam Malaysia, 65000 Nilai, Malaysia
Email: mus_mieme@yahoo.com



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Knowledge, attitude, and practice on Non-Communicable Diseases (NCDs) among the adult population in the urban area of Negeri Sembilan, Malaysia

Muslimah Ithnin¹, Nadeeya Ayn Umaisara Mohamad Nor¹, Norsham Juliana Nordin², Nadia Mohd Effendy³, Mohd Azmani Sahar⁴, Khadijah Hasanah Abang Abdullah⁴, Muhammad Shamsir Mohd Aris⁵, Mohd Dzulkhairi Mohd Rani^{*1}

¹Department of Primary Care, ²Department of Medical Science I, ³Department of Medical Science II, ⁴Department of Medicine Based Disciplines, ⁵Department of Surgical Based Disciplines, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Kuala Lumpur, Malaysia

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ABSTRACT

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Studies assessing the level of knowledge, attitude, and practice on non-communicable diseases (NCDs) among the general population are insufficient in literature. This study aimed to assess the baseline levels of knowledge, attitude, and practices (KAP) of the adult population in Malaysia urban area towards NCDs. A thoroughly designed and validated KAP questionnaire was administered, and the responses were coded and analysed. The survey involved 207 respondents from the urban area of Ampangan, Negeri Sembilan with an average age of respondents is 53.5 ± 17.86 years. Seventy-six (36.7%) were male and 131 (63.3%) were female. Majority of the respondents had good knowledge (81.2%) and attitude (53.1%) towards NCDs. However, only 8.7% of the respondents possess good practice while the majority had moderate (56.5%) practice score towards NCDs. Older age category of more than 40 years old had better knowledge scores compared to those below 40 years [median=25 (IQR=4) vs 23 (IQR=4), $p=0.001$]. Female respondents had higher attitude [25(7) vs 56(6), $p=0.004$] and practice [5(2) vs 5(3), $p=0.007$] scores compared to male. Responders with hypertension [25(4) vs 24(5), $p=0.002$] and diabetes mellitus [25(4) vs 24(4), $p=0.014$] had higher knowledge scores compared to non-disease respondents. The findings of this study depicted that respondents in the studied urban area had good knowledge and attitude towards NCDs. However, the practice was moderate. To overcome this problem, repeat reinforcement with health education will bring about a positive change in the urban general population knowledge towards NCDs, especially in young and non-disease population.

* Corresponding Author

Name: Dr. Mohd Dzulkhairi Mohd Rani
Phone: +603-4289 2000
Email: drzulkhairi@usim.edu.my

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INTRODUCTION

Lifestyle-related disorders which are classified as non-communicable diseases (NCDs) are leading causes of deaths worldwide and have emerged as major public health problems. NCDs are also known as chronic diseases, tend to be of long duration and are the result of a combination of genetic, physiological, environmental, and behavioural factors (Trovato, 2012). Metabolic syndrome such as high blood pressure, overweight/obesity, hyperglycemia, and hyperlipidaemia also contributed to the increased risks of NCDs (Lim and Cheah, 2016). World Health Organization (WHO) eventually listed four ma-

group of NCDs which is cardiovascular disease, diabetes, cancer and COPD (WHO, 2017).

People of all age groups, regions and countries are affected by NCDs. These conditions are often associated with older age groups, but evidence shows that 15 million of all deaths attributed to NCDs occur between the age of 30 and 69 years. Of these "premature" deaths, over 80% are estimated to occur in low- and middle-income countries (WHO, 2006).

NCDs now contribute to an estimated 73% of total deaths in Malaysia, with the main contributor being cardiovascular diseases which include heart attacks and strokes. An estimated 35% of deaths occur in individuals aged less than 70 years, which are mainly the working population. A review of metabolic syndrome in Malaysia by Lim and Cheah in 2016 indexing all literatures with original data involving the Malaysian population between the year 2000 and 2015 which include 75 articles revealed that metabolic syndrome affects 25% to 40% of the Malaysian adult population. However, all the studies conducted in Malaysia only focused on the prevalence of metabolic syndrome, while the study of population awareness of NCD and its risk factors are still lacking. Due to that, obtaining information about the level of knowledge of the general population is vital in forming a preventive programme for the disease. Thus, there is a demand to study the knowledge, attitude, and practice (KAP) among the general population to aid in future development of effective health education and provide a baseline for evaluating intervention programmes (Talib *et al.*, 1997).

This study aimed to assess the baseline levels of KAP among the general population of the urban area in Malaysia towards NCDs which include hypertension, stroke, ischemic heart attack, diabetes mellitus and chronic obstructive pulmonary disease.

MATERIAL AND METHODS

Study Design and Sampling

This study was approved by the Research Ethics Committee, Universiti Sains Islam Malaysia [USIM/JKEP/2017-27]. A cross-sectional study on villagers from an urban district in Malaysia using a stratified two-stage sampling method was conducted to identify the villages, whilst a selection of the respondents in these villages was based on convenience sampling. Written informed consent was obtained from respondents before the interview.

Upon selection of respondents, the questionnaire was administered through a face-to-face interview in the subject's house. The inclusion criteria for

this survey include Malaysian citizen residing in the urban area, aged 18 years and above, and able to communicate in the Malay language. Respondents are to be excluded if they suffer from a terminal or psychiatric illness with communication disabilities as well as pregnant women.

Study Questionnaire

This study was carried out using a pre-tested, modified validated questionnaire verified by experts from the Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia (USIM). The semi-structured interview questionnaire is comprised of three parts of close-ended questions. The first part was presented with details of the respondents including socio-demographic status. The second part focused on the respondents' disease profile of NCD. Self-reported hypertension, hypercholesterolemia, diabetes mellitus, chronic obstructive pulmonary disease and history of heart attack and stroke were recorded. For the KAP section, there are 27, 15 and 6 questions constructed for the knowledge, attitude and practice domain respectively. The questions were developed based on clinical practice guidelines on the management of hypertension, diabetes mellitus, stroke, chronic obstructive pulmonary disease as well as from the Malaysian Dietary Guidelines (MOH, 2010; MOH 2015).

The knowledge part consists of yes/no and correct/false questions with an additional option of unsure (1 point score for correct answers and 0 points for wrong or uncertain responses). The attitude was assessed based on the Likert criteria from 1 point, as the weakest, to 5 points, as a desirable score. To assess the practice domain, the respondents' exercise activity, tobacco use, vegetable consumption, body weighting practice and stress management were assessed (WHO, 2017).

The questionnaire was piloted among 30 respondents who had a similar profile of the target population. Validation results show that the constructed validity and reliability were optimal. Cronbach alpha coefficient values for KAP domains was 0.74 reflecting the good internal consistency and reliability.

Data Analysis

Data entry and statistical analysis were computed using the Statistical Package for Social Sciences (SPSS) version 23. The socio-demographic data were presented in frequencies and percentages. The normality of data was determined using the Kolmogorov-Smirnov test, as well as skewness and kurtosis values. All tests conducted were two-tailed. The alpha level of significance was set at

0.05 unless otherwise specified. Since the data is not normally distributed, the difference between NCDs KAP scores, and demographics and disease profile of respondents were analysed using the Mann-Whitney test.

Calculating the scores for each of the three sections (KAP), the quartiles were determined; the first and second quartiles were coded as poor, the third quartile was coded as moderate, and the last quartile was coded as good. Minimum scores for knowledge, attitude and practice were considered to be 0, 15 and 0, respectively and maximum scores were considered to be 28, 75 and 11, respectively. Respective thresholds and ranges for weak, medium and desirable scores were set as follows: knowledge <15, 15-21 and >21; attitude < 38, 38-56 and >56, practice <5, 5-7 and >7.

RESULTS

Socio-Demographic Characteristics

Data collection was conducted from 16th October until 10th November 2017 involving five villages in an urban area of Ampangan, Negeri Sembilan, Malaysia. 207 respondents were interviewed, and the mean age was 53.52 ± 17.86 years, with slightly more female (63.3%) than male. Table 1 shows the general characteristics of the respondents involved in the survey. The majority of respondents were aged 45 years old and above, 27.1% of the subjects were between 65 to 74 years of age. Almost half of the population received secondary school education and 63.3% of the respondents were married.

Disease Profile

Table 2 shows the disease profile of the respondents. The highest prevalence of disease was hypertension (34.3%) followed by hypercholesterolemia (24.2%) and diabetes mellitus (20.3%).

KAP Score

Majority of the respondents had good knowledge (81.2%) and attitude (53.1%) scores. However, the majority of respondents had moderate score towards practice (56.5%) and only 8.7% of the respondents had good practice score on preventing NCD. Summary of KAP score is demonstrated in Figure 1.

Table 3 revealed the correct answers for the key components of knowledge among the respondents. Only 30% of the respondents can correctly differentiate between non-communicable and communicable disease. Chronic obstructive pulmonary disease (COPD) was the disease with the highest all wrong answers by the respondents (11.6%). Whereas, less than half of the

respondents answer correctly (48.8%) for diabetes mellitus disease.



Figure 1: Knowledge, attitude and practice category among respondents (n=207)

Association of Sociodemographic and Disease Profile with KAP

Table 4 shows the scores for several age group, gender, educational level, marital status, household income and disease profile of hypertension, hypercholesterolemia and diabetes mellitus. There is an increased score in elderly group age 40-year-old and above for knowledge score [25 (IqR=4)] vs23 (IqR=5), p=0.010]. However, no significant difference in attitude and practice were recorded in the age group.

Knowledge and practice scores of male and female groups were not significantly different. However, females had higher scores in attitude compared to male [57 (IqR=7) vs 56 (IqR=6), p=0.025] and practice [5 (IqR=2) vs 5 (IqR=3), p=0.007].

Higher income group of RM3001 and above possess significantly higher knowledge scores compared to lower income group [25.5 (IqR=3) vs 24 (IqR=4)]. However, there is no significant difference in attitude and practice between different household income groups. The KAP score for different educational level and marital status was not significantly different.

There was also a significant difference in knowledge score of respondents with hypertension [25(IqR=4) vs 24(IqR=5), p=0.002] and diabetes mellitus [25(IqR=4) vs 24(IqR=4), p=0.014] which are higher compared to the non-disease respondents. There are no significant differences in attitude and practice among respondents with hypertension, hypercholesterolemia and diabetes mellitus and non-disease respondents.

Table 1: Sociodemographic of the respondents (n = 207)

Characteristics	n	%
Age, years [mean (SD)]	53.52 (17.86)	
Age Category		
18-40	55	26.6
41-59	57	27.5
60 and above	95	45.9
Gender		
Male	76	36.7
Female	131	63.3
Educational Level		
No formal education	4	1.9
Primary education	57	27.5
Secondary education	105	50.7
Tertiary education	40	19.3
Others	1	0.5
Marital Status		
Single	38	18.4
Married	131	63.3
Widow	34	16.4
Divorced/ Separated	4	1.9
Household income, RM [mean (SD)]	1974 (1930)	

Table 2: Disease profile of the respondents (n = 207)

Disease	n	%
Hypertension	71	34.3
Hypercholesterolemia	50	24.2
Diabetes Mellitus	42	20.3
Ischaemic Heart disease	13	6.3
Stroke	3	1.4
Asthma	2	1.0
Chronic Obstructive Pulmonary Disease	1	0.5

Table 3: Correct answer to key component of knowledge among respondent, n=207

Component, n=207	All correct, n (%)	All wrong, n (%)
Examples of NCDs	62 (30.0)	3 (1.4)
Heart attack	138 (70.5)	4(1.9)
Stroke	132(63.8)	6(2.9)
Hypertension	110 (53.1)	3(1.4)
Diabetes Mellitus	101 (48.8)	6(2.9)
Chronic obstructive pulmonary disease	158 (76.3)	24 (11.6)

n = frequency, NCDs = non-communicable diseases

DISCUSSION

In recent years, the progression of urbanization and industrialization, as well as due to the decreased physical liveliness and changes in dietary patterns especially with more fat consumption are known to be associated with changes in health. This is particularly true in urban population which often lead to increased prevalence of NCDs (Noor, 2002; Khambalia and Seen, 2010; Zainuddin, 2012). Due to the exponentially increasing rate of NCDs, unnecessary burden of NCDs suffered by individual, family, society and government, and the modifiable risk factor that can reduce the risk of NCDs, the study on KAP among the general population is vital to promote health education,

nutritional status, and the healthy lifestyle of the population.

Although there were KAP studies conducted on diseases and the general population, most of them were only focused into specific diseases such as cardiovascular disease and diabetes mellitus (Ambigapathy et al., 2003; Ding et al., 2006; Ibrahim et al., 2016). Most of the studies also looked only at the prevalence and related risk factors towards NCDs (Lim and Cheah, 2012).

According to National Health Morbidity Survey (NHMS) in 2015, Diabetes Mellitus is among the disease with a high prevalence rate in Malaysia after cardiovascular disease (IPH, 2015). However, less than half of the respondents were able to

Table 4: Knowledge, attitude, and practice score association with demographic groups and disease profile

Variable	Median (IqR)	z-statistics	P-value ^a
Age (years)	Below 40, n= 52	40 and above, n=155	
Knowledge	23 (5)	25 (4)	-3.417 0.001**
Attitude	56 (4)	57 (6)	-1.962 0.050
Practice	5 (2)	5 (2)	-0.858 0.391
Gender	Male, n= 76	Female, n=131	
Knowledge	24 (6)	25 (6)	-0.807 0.420
Attitude	56 (6)	57 (7)	-2.236 0.025*
Practice	5 (3)	5 (2)	-2.542 0.011*
Educational level	Primary, n= 57	Secondary, n= 105	
Knowledge	24 (3)	25 (4)	-1.617 0.106
Attitude	57 (6)	57 (6)	-0.696 0.486
Practice	6 (2)	5 (2)	-0.771 0.441
Household income	≤RM 3000, n=181	>RM3000, n=26	
Knowledge	24 (4)	25.5 (3)	-2.274 0.023*
Attitude	57 (6)	57.5 (6)	-0.901 0.368
Practice	5 (2)	6 (3)	-0.506 0.613
Hypertension	Yes, n= 71	No, n=136	
Knowledge	25 (4)	24 (5)	-3.078 0.002**
Attitude	58 (7)	57 (5)	-0.748 0.455
Practice	6 (2)	5 (2)	-1.006 0.314
Hypercholesterolemia	Yes, n= 50	No, n=157	
Knowledge	25 (3)	24 (5)	-1.840 0.066
Attitude	58 (7)	57 (6)	-1.206 0.305
Practice	5 (2)	5 (2)	-0.228 0.820
Diabetes Mellitus	Yes, n= 42	No, n= 165	
Knowledge	25 (4)	24 (4)	-2.446 0.014*
Attitude	58 (6)	57 (6)	-0.816 0.415
Practice	5 (2)	5.5 (2)	-0.916 0.360

answer all the correct answers regarding diabetes mellitus risks, symptoms, medication and complications. Among all the diseases, COPD had the highest number of respondents with all the wrong answers. About 7% of all deaths in Malaysia was due to chronic respiratory diseases including COPD (WHO, 2014). COPD is a preventable disease and may develop due to modifiable risk factors for tobacco use and does not present itself until clinically apparent (Loh et al., 2005; Pirabbasi et al., 2015). Thus, there is a need for increased knowledge among the general population concerning this disease.

Only 8.7% of the respondents had good practice score. Most of the respondents do not exercise for more than three times per week, lacking vegetable consumptions, and did not weight at least once a week. An important practice for all ages is to adopt a more active lifestyle and be more cautious of their food habits towards approaching healthy and balanced lifestyle to reduce the risks of NCD (Norimah and Kather, 2003; Teh et al., 2015). The alarming figure of practise score indicated an urgent need to increase population good practise to prevent the occurrence of NCDs for non-disease

population and also for better control of disease among diagnosed NCD population.

Knowledge and awareness study among younger generation regarding NCDs is very crucial in reducing its prevalence (Ibrahim et al., 2016). In this study, there was a significant difference in knowledge score among the young adult group as their knowledge score was significantly lower compared to the older group. Younger age group are at higher risk to develop the disease at an older age if their attitude and practice towards NCDs remain unchanged (Khambalia and Seen, 2012; Ibrahim et al., 2016). Knowledge programmes among youngster should be increased as it may reduce the pace of risk factor development in the future.

Findings from the study also showed that the lower income group had lower knowledge score than higher income group. A study by Ding et al. (2006) in Negeri Sembilan, Malaysia showed that the income of diabetic respondents was significantly lower than the higher income group. A systematic review by Dans et al. (2011) concluded that modifiable risk factors are increasing in low-income populations because of ineffective

urbanisation, marketing of unhealthy food, and inadequacies in public health policies. Therefore, it is essentially important to conduct more research in this lower income group in urban areas to better understand the needs of this population.

Female respondents had a significantly good attitude and practice towards NCDs as compared to male respondents. A high proportion of positive attitude on screening and measuring risk factors was due to their awareness towards healthy lifestyles such as healthy eating and regular exercise as promoted in the mass and social media eventually promote their behaviour change (Lynch et al., 2006; Muhammad et al., 2012). Most of the women also reported high vegetable consumption, were a non-smoker and possess good weighting practice. This is also in line with a study by Muhammad et al. (2012) and Ibrahim et al. (2016) which demonstrated that female had a better attitude and practice scores towards risk factor of cardiovascular disease.

Respondents with hypertension and diabetes mellitus had significantly higher knowledge scores compared to non-disease respondents. This is consistent with the study by Ding et al. (2006) in Negeri Sembilan urban area which showed that diabetic respondents had higher knowledge scores. Population with the disease consistently received continuous education from medical officers or healthcare staffs on their disease. Thus their level of knowledge on the disease was high. However, attention shall be given to the non-disease population to reduce the burden of NCDs in this population.

Limitation

As this study only focused on KAP domains in an urban area, it may not represent the data of the general population. However, the results of this study can be used as an initial plan for future education and intervention programmes. Malaysia consists of multicultural ethnic group and studies had shown that this may contribute to the risk of developing NCDs (Rampal et al., 2012; Omar et al., 2016). However, the association was not studied as the number of respondents from ethnics other than Malay were low.

CONCLUSION

Majority of the respondents demonstrated poor practice concerning NCDs despite having good knowledge and attitude. NCDs and their complications can largely be prevented if the relevant healthy and balanced lifestyle is practised among the population. This study revealed a reasonable gap between knowledge, attitude, and practice especially in the younger age group, lower income and non-disease population. To overcome

this, it is very important to formulate and implement a proper strategy and mechanism by which positive attitudes can be converted into beneficial practices.

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Conflict of Interest

The authors reported no conflict of interest.

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Article

A Scientometric Analysis of Studies on the Effects of the Date palm (*Phoenix dactylifera*) Fruit on Human Health

Tanty Shahrumi Abdul Rahman¹, Khairullah Bin Anuar¹, Mohd Dzulkhairi Bin Mohd Rani¹, Asmalita Binti Syaiful¹, Muslimah Binti Ithmin¹, Mohd Khairul Nizam Bin Zainan Nasri^{2,a}, Asma Abdul Rahman², Mohd Radzniwan A. Rashid¹, Faizul Helmi Addnan¹, Khairun Nain Bin Nor Aripin^{1,a}

¹ Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia (USIM)
E-mail: *khairun@usim.edu.my

² Faculty of Quranic and Sunnah Studies, Universiti Sains Islam Malaysia (USIM)
E-mail: *drknizamzn@usim.edu.my

Abstract— Background/Aims: Date palm, *Phoenix dactylifera*, is mentioned 27 times in the Holy Quran and is considered a prophetic food. Islamic scripture together with Jewish and Christian holy texts refers to date palm fruit as having many beneficial effects on health including medicinal properties. This study aims to characterize scientific studies on date palm fruit relating to human health in published scientific literature.

Methods: Five major scientific databases of published literature were searched for papers relating to the effects of date palm on human health. A scientometric analysis was then performed on the studies obtained.

Results: Analysis of 270 relevant papers revealed a lack of human subject studies despite numerous papers reporting beneficial nutritional properties and promising results from animal studies. Saudi Arabia leads global research output on this topic.

Conclusion: Further research should be supported to advance knowledge useful to local populations, especially in Islamic countries where the widely accessible date palm fruit can confer many potential health benefits.

Keywords— Date palm; health; *Phoenix dactylifera*; scientometric.

I. INTRODUCTION

The fruit of the date palm, *Phoenix dactylifera*, is widely consumed by populations in vast areas of Asia and northern Africa. Its importance as a nutritious food source has been well documented going back several millennia. Alongside numerous historical references, there are many references to date in Judeo-Christian texts as possessing health preservation and even therapeutic properties. The Holy Quran mentioned the date palm fruit 27 times under several names and referred to similar beneficial properties conferred by the fruit (Abdul Baqi, 1994; Al-Bukhari, 2000; Al-Sijistani, 1985; Al-Razi, 1992).

Considering the importance of the date palm, there has been a steadily increasing amount of scientific research relating to the fruit. This trend has been established by a previous scientometric study published in 2014 (Alhaider et al. 2014) that analyzed global research output relating to date palm between 2000 and 2011. The study obtained and characterized 1376 scientific articles from Scopus.

The regions where the date palm fruit is consumed also carry amongst the heaviest burden of global disease and contain many impoverished populations (Bouaziz et al., 2008).

Many nutritional studies have shown that the accessible and cheap date palm fruit possesses high energy content and also provides essential vitamins and minerals (Al-Turki et al., 2010; Hong et al., 2006). Furthermore, it also contains many compounds that preserve and benefit health such as phenolics, flavonoids, sterols and procyanidins (Khanjari et al., 2009).

Notwithstanding the published nutritional studies, the body of scientific studies investigating the health effects of date palm fruit appears to be small and poorly organized. This is incongruent with revealed Islamic knowledge from the Quran and the Hadith, as well as from Judeo-Christian texts that refers to the date palm fruit as having potential healing properties. Therefore, we aimed to characterize and quantify the scientific research relating to the effects of date palm on human health.

The main objective of this study is to perform a scientometric analysis of the current published research that investigates the effects of the date palm fruit on human health.

II. MATERIALS AND METHODS

Five main databases were systematically searched for studies investigating the effects of date palm fruit on human health outcomes. These were Embase, Medline, Scopus,

ProQuest and Ebscohost. The databases were searched consecutively. Limited hand searching was also conducted once the 5 databases had been searched. Each index database was accessed via their respective gateways or portals. The following search terms were used individually or combined to conduct the search: Individual search are as follows 'date', 'palm', 'phoenix', 'dactylifera', combine words ('date' and 'palm'), correlation of ('date' and 'palm') or 'phoenix' or 'dactylifera'. There was no year limit for the data searched.

In order to ensure the relevant papers were selected, the title and abstract of each study obtained while searching were reviewed in two stages. The first stage involved independent assessment by at least two reviewers to determine eligibility (TSBAR, ABS, MBH) while the second stage involved confirmation from an expert assessor (KBA, MDBMR, KNBNA). Studies on *P. dactylifera* using the flesh, pulp, pits or kernel were included. However, studies that used parts of the plants other than the fruit were excluded. To be eligible, the study must have measured parameters of outcome that relates to human health. Only papers written in English were chosen to allow adequate analysis.

Full papers were obtained for all eligible studies. The selected citations and their full study reports were managed using Endnote (Endnote X7). Scientometric analysis was then performed on the compiled database.

III. RESULTS

Initial searching through the five databases yielded a total of 8390 citations of potentially relevant studies. The citations included articles published from the year 1966 until 2015 over a duration of 49 years.

Following the two stages of filtering, 270 eligible studies were identified using the inclusion and exclusion criteria listed previously. The publication output of the human health effects of date palm has increased rapidly every year from 1966 to 2015. After eliminating duplicate papers from each database, the total number of papers found first from each database is shown in Table I.

TABLE I
TOTAL NUMBER OF PAPERS BASED ON DATABASE SEARCHED

Database	Total Papers	Percentage [%]
Embase	66	24.4
Medline	60	22.2
Scopus	108	40.0
ProQuest	13	4.8
Ebscohost	15	5.6
Other Sources	8	3.0
Total	270	100

Scopus indexed the highest total number of published reports with a total of 40% of all included studies. The second highest database was Embase with a total percentage of 24.4%, followed by Medline with 22.2%, Ebscohost with 5.6% and ProQuest with 4.8%. The studies on date palm fruit were divided into two main groups that were interventional and non-interventional studies. There were 98 (36.3%) interventional studies where subjects including human,

animal and microorganisms were administered date palm fruit and outcomes relevant to human health were measured. Non-interventional studies totalled 172 (63.7%). These were studies where date palm fruit was studied to assess their potential effects on human health.

Each group was further classified based on the subject of the study, as shown in Table II. Most papers seemed to be nutritional analyses of date palm fruit with well over half (56.7%) of all the studies being in this category. Interestingly, the second most frequent study was interventional animal disease model studies where date palm fruit was fed or administered to the animal subjects.

TABLE III
STUDIES CATEGORISED TO TYPE AND SUBJECT

Intervention		Non-intervention	
Categories	Total	Categories	Total
Human	9	Nutrition	153
Animal	58	Toxicology	9
Cell / Tissue / Blood	9	Allergen	2
Pathogen	22	Pathogen	6
		Miscellaneous	2
Total	98	Total	172

The country contributing the most published studies was Saudi Arabia with 43 (15.9%) of the total papers, seen in Table III. This was followed by Tunisia with 32 papers (11.9%), Iran with 27 (10%) and others. Thus the Middle East and northern African regions contributed the most towards global research output on health effects of date palm. Interestingly the USA and the UK also contributed significantly to global research on date palm fruit health effects with almost 10% of the total studies.

TABLE IV
COUNTRY OF ORIGIN FOR STUDIES

Country	Total Number Papers Published
Saudi Arabia	43
Tunisia	32
Iran	27
Egypt	18
United Arab Emirates	16
Algeria	15
Oman	14
United States of America	13
United Kingdom	11
India	10
Pakistan	9
Jordan	7
France	5
Nigeria	5
Greece	4
China	4
Bahrain	3

Israel	3
Japan	3
Kuwait	3
Libya	3
Malaysia	3
Morocco	3
Canada	2
Spain	2
Sudan	2
Yemen	2
Others	8
Total	270

IV. DISCUSSION

Although the number of date palm studies relating to human health appears to have increased over the years, the studies are relatively few. We found only 270 reports on studies of date palm fruit relating to human health after searching five major databases. Correspondingly, a previous scientometric study found that global research output on Phoenix dactylifera consisted of 1376 papers (Alhaider et al, 2014). Considering that this previous study included vast numbers of botanical and agricultural studies, this lends further support to the apparent low numbers of studies that investigate date palm fruit as a health food.

Most of the studies were first found in index databases of Scopus and Embase followed by Medline. This further supports the idea that relatively little attention is given to studying date palm fruit in relation to health as Medline is regarded as the eminent index database of healthcare research.

The findings showed that only nine published papers were studies using human subjects. This minuscule number of human subject studies was surprising considering these studies would provide the most usable evidence in elucidating health effects of date palm fruit. Furthermore, human subject studies would not require large resources since the date palm fruit is abundant and easily obtained globally. As a commonly consumed food it also presents little risk that would hinder human subject studies.

Findings from the few human subjects' studies have shown that date palm fruits may confer important health preservation and therapeutic benefits. The human studies suggest that date palm fruit provides significant prevention of childbirth complications (Al-Kuran et al, 2011; Khadeem et al, 2007), anti-aging effect on skin (Bouaziz et al, 2008), a benign effect on glucose and lipid profile yet improves oxidative status in humans (Ahmed et al, 1991; Bauza et al, 2002; Rock et al, 2009).

There were relatively more studies using animal models of human diseases as subjects, as well as research on the effects of date palm fruit on pathogens relevant to human health. Many promising health effects of date palm fruit such as pro-fertility, anticancer, cytoprotective, anti-mutagenic, anti-oxidative stress, anti-diabetes, antihypertensive to name a few, were demonstrated by these studies (Ayobon et al, 2014; Saafi-Ben Salah et al, 2012). The imperative should be to extend the investigations of these promising effects into human subject studies with the aim of providing solid evidence of the beneficial effects of date palm fruit.

The most numerous studies by far were nutritional of date palm fruit in relation to human consumption have been several large reviews of the nutritional p of date palm fruit (Mousavi et al, 2014; Rahmani et al; Vayalil, 2012) and the value of date palm fruit as a wholesome food is well established at this junctur studies show that date palm fruit contains essential v minerals, antioxidants, phenolic compounds, fla phytochemicals and many other beneficial substanc stands in contrast to the dearth of research on the nutr and therapeutic effects of date palm fruit as pr mentioned. Considering that references in Islamic, and also previous Jewish and Christian text in specifically on the medicinal potential of date pa further research should be performed to explore the n effects of date palm fruit.

The majority of date palm fruit studies relating came from institutions in Islamic countries. Our fin Saudi Arabia led the research output for health effect palm fruit was consistent with a previous scien analysis of global date palm research output over fields of study (Alhaider et al, 2014). Our study reafi very high research activity on P. dactylifera in Saudi reflecting a national research priority on this prophel The origin of research activity also seems to correlate countries that produce the bulk of date palm fru <http://www.fao.org/docrep/006/y4360e/y4360e00.H>

Almost 10% of studies came from the traditional I world health research, namely the USA and the Kingdom. In fact, the previous scientometric paper (et al, 2014) found that if all fields of study were incl USA came second behind Saudi Arabia in researc relating to P. dactylifera. Therefore, there apper significant research interest on date palm fru, yet there is limited or no production of the food.

Our study searched a wide range of index d including five of the major databases containing bi publications the scientometric analysis was conduct gives additional weight to our study compared to pr published scientometric studies. Furthermore, it focused nature of our study on research pertaining to health provided useful insights on the characteristic: palm fruit scientific studies with relevance to Islamic and references in the holy text. A limitation to our stur arise from the possibility of certain research pap published in languages other than English, therfo absent from our scientometric analysis. Another limitation can be expected from the current state of in of research literature whereby papers from the d nations dominate the scientific space. Thus pap countries where date palm is produced may not gain s exposure compared to papers from the develop Nevertheless, our search has compiled human pap developing and even low income countries. Scien analyses such as those done can further highlight from developing countries, particularly in the Islam to advance scientific knowledge relevant to a population.

V. CONCLUSIONS

In conclusion, our scientometric analysis of scientific studies on the health effects of date palm fruit has revealed important characteristics of the research activity on this prophetic food. There should be more human subject studies considering the growing evidence base of the beneficial health effects from nutritional analysis studies as well as potential medicinal properties from animal model studies using date palm fruit. Saudi Arabia currently leads the global research activity on this prophetic food, however there is research interest on health effects of the fruit of P. dactylifera worldwide. Further research on date palm fruit should be encouraged and supported considering the importance given to it by Islamic scripture together with the other Abrahamic religions.

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ORIGINAL ARTICLE



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Comparison of health-seeking behaviour between urban and rural Malay population of negeri sembilan, Malaysia

Mohd Dzulkhairi Mohd Rani^{1*}, Muslimah Ithnin¹, Nadeeya 'Ayn Umairah Mohamad Nor¹, Norsham Juliana¹, Nadia Mohd Effendy¹, Sahar Azmani¹, Khadijah Hasanah Abang Abdullah¹, Muhammad Shamsir Mohd Aris¹, Izuddin Fahmy Abu²

¹Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Kuala Lumpur, Malaysia

²Institute of Medical Science Technology (UniKL MESTECH), Universiti Kuala Lumpur, Kajang, Selangor, Malaysia

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ABSTRACT

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Keywords:

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There is a growing interest on research related to health-seeking behaviour. However, there are minimal studies in Malaysia which focus on this. This paper aimed to determine the health-seeking behaviours among Malay population and its association based on the localities of the urban and rural population. To achieve this purpose, a cross-sectional survey was conducted using face-to-face interview method. A total of 480 respondents participated in this survey with the majority (57.7%) of them were from rural area. Among all the subjects, 4.9% and 5.4% of urban and rural participants respectively, did not seek treatment when they were sick. The reason being are they chose to ignore the pain (80%), time-consumption (30%), they do not believe in modern treatments (8%). A higher number of participants chose public healthcare facilities compared to urban (82.72.6%, $p < 0.001$), whereas a higher number of urban participants chose private healthcare facilities in contrast to rural participants (25.33% vs. $p < 0.001$). For participants with chronic diseases, 5.3% did not go for treatment, 91.2% rely on healthcare staffs for information on the diseases, and took traditional or supplementary medicine. Majority of the participants in agreement that the accessibility to public healthcare facilities, in terms of distance, transportation and operational time, as well as the services treatments, were good. Overall, majority of the respondents prefer treatments from public healthcare facilities followed by private facilities and pharmacies. However, there is a small number of participants who seek for treatments, including those with chronic diseases. Further studies shall be conducted to explore the barriers to seeking treatments in this population.

*Corresponding Author

Name: Mohd Dzulkhairi Mohd Rani

Phone:

Email: drdzulkhairi@usim.edu.my

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INTRODUCTION

Numerous research have long been interested what facilitates the use of health services, what influences people to behave differently toward their health. This is termed as health-seeking behaviour (Tee *et al.*, 2011) (Dawood

2017). According to (Macklin, 2003), there are two approaches to understanding health-seeking behaviours; the first approach understands the utilization of the healthcare system, and the second approach is to understand the process of illness response. Several factors are determining how people engage with healthcare systems including socio-demographic of education, social structures, cultural beliefs and practices, gender issues, economic and political systems, environmental conditions, disease patterns and the healthcare system itself (Macklin, 2003) (b T. Shaikh *et al.*, 2008).

Malaysia has a dual-tiered system of healthcare services, which consist of the public and private sectors. The Ministry of Health manages the public healthcare sector, Malaysia, which includes various centres from rural and community clinics, to district and tertiary specialist hospitals throughout the country. The private sector, on the other hand, contains general practitioner clinics, and private medical centres and hospitals. In comparison to the tax-funded public healthcare sector, private sector services rely mostly on a self-paying fee-for-service arrangement, and its service increases through third party paying, such as via health insurance mechanisms (Chee, 2008) (Quek, 2009).

Another option for healthcare utilization in Malaysia is via community pharmacy. A community pharmacy or also known as retail pharmacy provides prescription drugs, among other products to a specific community group or region. Community pharmacists oversee the fulfilment of medical prescriptions and are also available to advise on their offerings of over-the-counter drugs (Sing, 2001).

The availability of options for healthcare utilization in Malaysia might influence the behaviour of illness responses among people. The Malaysian population is usually categorized into two different localities; urban and rural, which is based on population density. As defined by the (of Statistics, 2010), Malaysia: Population and Housing Census 2010, urban is a gazetted area and its adjoining built-up areas which had a combined population of at least 10,000 during the census, or a specific development area having a population of 10,000 people or more where at least 60 per cent of them (aged 15 years and above) are engaged in non-agricultural activities. In contrast, rural is an area with a population of fewer than 10,000 people with predominantly agriculture and natural resources. These physical differences will most definitely influence health-seeking behaviour in several determinants including distance and physical access, the economic cost

of care, travel, transportation, time, and also cultural beliefs (Kloos, 1990) (Andersen, 1995) (Macklin, 2003). Data from the Population and Housing Census 2010 indicated that 50.8% of Malaysian citizens are Malays and that studies have reported that other than modern medicine, many of them still choose traditional medicine for their treatment of illnesses (Razali *et al.*, 1996) (Hasan *et al.*, 2009).

A proper understanding of health-seeking behaviours in the community may reduce delay in diagnosis, improve treatment compliance and improve health promotion strategies in a variety of contexts. Therefore, this study was designed to determine the health-seeking behaviour among the Malay population in Malaysia and their association between localities of urban and rural.

MATERIALS AND METHODS

Research Design

A cross-sectional study was carried out to evaluate the first action towards accessing healthcare facilities and medicine-taking behaviour among the general public. This study was conducted from October 2017 to February 2018 in the Negeri Sembilan state of Malaysia. Study approval was obtained from the Research Ethics Committee, Universiti Sains Islam Malaysia [USIM/JKEP/2017-27].

Study Population

The selection of district was performed using a stratified two-stage sampling method to identify the villages, while the range of respondents in these villages were based on convenience sampling. Two localities were selected for study comparison; Ampangan is representing the urban area, while Kuala Pilah and Jelebu are rural areas located in Negeri Sembilan, Malaysia.

Adult subjects comprised of both genders who can read and write in Malay language and have given their written informed consent were included in this study, whereas those below 18 years old and disagree to participate were excluded.

Data Collection Tool

The questionnaire used to obtain data from the participants were adapted based on previous literature and Kroeger's framework of health-seeking behaviour (Kroeger, 1983). The questionnaire consisted of three parts which were mainly used to evaluate the health-seeking and medicine-taking behaviours among the general public.

The first part of the questionnaire was to obtain demographic data of the participants, which include age, gender, ethnicity, education level, monthly

income and presence of chronic diseases. If a participant had a presence of chronic disease, additional questions on follow-up treatment, seeking information on the disease, and additional traditional medicine acquired would be asked.

The second part evaluated the health-seeking behaviour by asking the participants whether they will seek for treatments when experiencing any health problems, and the third part evaluated the accessibility to public healthcare facilities and also accessibility to obtain medicine and treatment.

To improve the clarity of the questionnaire items, a pilot test was conducted with thirty respondents who had similar profiles with the target population of the study. Based on the comments from the participants, several questionnaire statements were modified for better clarity, but not to change its meaning.

Data Collection Method

A face-to-face interview using the questionnaire was conducted to obtain the data from all participants in this survey. The researchers explained the aim of the study before data collection and signed consent forms were obtained from all participants before they were enrolled in the survey.

Statistical Analysis

The data were coded and analysed using Statistical Package for the Social Sciences (SPSS) version 23.0. Frequencies and percentages presented descriptive statistics. Chi-square test was performed to find the association between health-seeking behaviour and the social-demographic data of localities among participants. P-value of <0.05 with a confidence level of 95% was considered significant.

RESULTS AND DISCUSSION

Table 1 presents the socio-demographic data of the participants. The mean age for all the participants is 53.56 (SD=17.017); 53.33 (SD=17.954) for urban population and 53.73 (SD=16.322) for rural people. Majority of the participants were female (59.0%), while 41.0% were male. The education level of the participants was distributed from college or university (16.3%), secondary school (50.4%), primary school (29.2%) to no formal education (3.5%). About the monthly household income of the participants, the majority obtain a low monthly income of MYR3,000.00 (87.2% from urban and 87.7% from rural area). The mean individual and family monthly expenses for health is higher among urban participants compared to rural. As for the presence of chronic diseases, 47.1% of the participants were suffering from chronic diseases such as hypertension,

diabetes, and asthma.

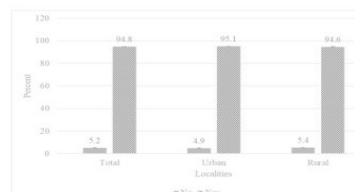


Figure 1: Seeking treatment behaviour when respondents are sick, n=455

Figure 1 shows the result for the question whether they will seek treatment if they experienced any health problems; the majority of the participants (94.8%) answered yes. 4.9% of urban and 5.4% of rural participants will not seek treatment and ignore their sickness with reasons shown in Table 2. For both localities, the majority of participants (80%) does not care about the pain.

As demonstrated in Table 3, the majority of participants with chronic diseases (94.7%) seek for follow-up treatment. There is no significant difference between follow-up treatment and the behaviour of seeking information on the disease between urban and rural groups. However, a considerable difference (p=0.023) in the usage of supplements or traditional medicine between the two localities were observed; urban participants had a higher tendency to acquire additional supplements or conventional dose (25.8%) as compared to rural participants (13.8%).

As displayed in Table 4, there is a significant difference between modern treatment choices based on localities. A higher percentage from the rural population chose public healthcare services (89% vs 72.6%, p<0.001), and in contrast, a higher percentage of urban participants chose private healthcare facilities compared to rural (25.3% vs 9.9%, p<0.001). However, no significant association between traditional treatments of choice between the localities; 65.7% of the total participants had used traditional massage, followed by cupping therapy (28.2%) and Islamic medical practices (2.9%). Table 5 shows the accessibilities to public healthcare facilities and behaviour of seeking treatment and medicines at those centres. For both urban and rural localities, majority of the participants do not access public healthcare facilities in terms of distance (93.6% vs 95.8%), transportation (88.7

Table 1: Socio-demographic information of the participants based on localities, n=480

Variables	Total, n (%)	Urban, n (%)	Rural, n (%)
Age, year [mean (SD)]	53.56 (17.014)	53.33 (17.954)	53.73 (16.322)
Gender			
Male	197 (41.0)	74 (36.5)	123 (44.4)
Female	283 (59.0)	129 (63.5)	154 (55.6)
Educational level			
No formal education	17 (3.5)	2 (1.0)	15 (5.4)
Primary school	140 (29.2)	56 (27.6)	84 (30.3)
Secondary school	242 (50.4)	104 (51.2)	138 (49.8)
College/University	78 (16.3)	40 (19.7)	38 (13.7)
Other	3 (0.6)	1 (0.5)	2 (0.7)
Working status			
Not working	319 (66.5)	150 (73.9)	169 (61.0)
Working	161 (33.5)	53 (26.1)	108 (39.0)
Household income per month, RM			
Less than 3000	420 (87.5)	177 (87.2)	243 (87.7)
3000 and above	60 (12.3)	26 (12.3)	34 (12.3)
Individual health expenses per month, RM	22 (73.142)	40 (101.654)	8 (32.910)
Total family health expenses per month, RM	22 (102.618)	36 (134.124)	12 (67.786)
Chronic disease			
No	254 (52.9)	107 (52.7)	147 (53.1)
Yes	226 (47.1)	98 (47.3)	130 (46.9)

Table 2: Reasons for respondents not seeking treatment, n=25

Reason	Total, (%)	Urban, (%)	Rural, (%)
Do not believe / like the health facilities provided	2 (8.0)	2 (20.0)	0 (0)
Distance / vehicle problems	1 (4.0)	1 (10.0)	0 (0)
Not enough time / busy with work	2 (8.0)	0 (0)	2 (13.3)
Do not care about the pain	20 (80.0)	7 (70.0)	13 (86.7)

Table 3: Health-seeking treatment for participants with chronic diseases, n=226

Variables	Total, (%)	Urban, (%)	Rural, (%)	χ ²	-value
Follow-up treatment					
No	12 (5.3)	5 (5.2)	7 (5.4)	0.003	0.935
Yes	214 (94.7)	91 (94.8)	123 (94.6)		
Obtaining information on the diseases from:					
Staff / Health personnel	206 (91.2)	86 (89.6)	120 (92.3)	0.508	0.476
Others	20 (8.7)	10 (10.4)	10 (7.7)		
Used supplements / traditional medicine					
No	18 (81.1)	72 (74.2)	112 (86.2)	5.147	0.023*
Yes	43 (18.9)	25 (25.8)	18 (13.8)		

*Statistically significant P<0.05.

Table 4: Choices of treatments among the participants

Choices of treatments	Total, (%)	Urban, (%)	Rural, (%)	χ^2	<i>p</i> -value
Modern treatments, n=452					
Public healthcare facility	372 (82.3)	138 (72.6)	234 (89.3)	21.462	<0.001
Private healthcare facility	74 (16.4)	48 (25.3)	26 (9.9)		
Pharmacy	6 (1.3)	4 (2.1)	2 (0.8)		
Traditional treatments, n=103					
Traditional massage	67 (65.7)	32 (69.6)	35 (62.5)	5.442	0.02
Cupping therapy	28 (28.2)	9 (19.6)	19 (33.9)		
Islamic medical practitioner	3 (2.9)	2 (4.3)	1 (1.8)		
Acupuncture	2 (2.0)	2 (4.3)	0		
Shaman	2 (2.0)	1 (2.2)	1 (1.8)		

*Statistically significant $P < 0.05$.

Table 5: Accessibility and obtaining treatment and medicine at public healthcare centres,

Accessibility	Urban, n (%)		Rural, n (%)	
	Agree	Disagree	Agree	Disagree
To the public healthcare centres				
Location was near to house	190 (93.6)	13 (6.40)	251 (95.8)	11 (4.2)
Have no transportation problems	180 (88.7)	23 (11.3)	239 (91.2)	23 (8.8)
Operational hour is suitable	200 (98.5)	3 (1.5)	261 (99.6)	1 (0.4)
Waiting time is not burdening	95 (46.8)	108 (53.2)	124 (47.3)	138 (52.7)
To get treatment and medicines				
Health services provided are good	197 (97.0)	6 (3.0)	261 (99.6)	1 (0.4)
Medicines needed can easily be obtained	200 (98.5)	3 (1.5)	262 (100)	0
Modern medicines are easier to get than traditional medicines	200 (98.5)	3 (1.5)	261 (99.6)	1 (0.4)
Comfortable with the services	192 (94.6)	11 (5.4)	260 (99.2)	2 (0.8)
Will recommend to family and friends to get treatment at government health centres	188 (92.6)	15 (7.4)	261 (99.6)	1 (0.4)

vs 91.2%) and operational time (98.5% vs 99.6%). However, more than half of the participants agreed that the waiting time at public healthcare facilities is burdening for both urban and rural localities (53.2% vs 52.7%). In terms of accessibility to get treatment and medicine, majority of the participants (more than 90%) were happy with the services, found it easy to get medicine, comfortable with the services, will recommend public healthcare facilities to family and friends, and that modern medicines are easier to obtain compared to traditional treatments.

The present study revealed that most people prefer to consult a physician when facing any health problems with only a small number will consult a pharmacist. This is in line with the 2015 National Survey on the Use of Medicines (NSUM, 2015), which reported that approximately 84% of the population would consult the government or private physicians for any health problems, while only 11% practised self-medication. However, the number of participants who did not seek treatment when confronted with any medical issues is worrying. 4.9% urban and 3.4% rural participants chose to ignore their sickness with the most popular reason given is that they do not care for the illness or pain. This ignorance to seek for treatment should be further explored to better understand the need and awareness of diseases in this study population.

For participants who do seek for treatments, the majority of them preferred public healthcare services, more significantly than private facilities and pharmacy. The urban population recorded a higher percentage of choosing private healthcare facilities compared to rural, and in reverse, the rural group had a higher percentage of choosing public healthcare facilities. Physical determinants, including demographic factors, had been reported to influence health-seeking behaviour among people. In this regard, the urban population had more option in selecting the preferred healthcare facility that suits their need such as time and hospitality (Kloos, 1990) (Andersen, 1995); (b T. Shaikh *et al.*, 2008).

Since the mean age of the participants involved in this study was 53.56 years old, a high number of participants (47.1%) were reported with at least one chronic disease. Of these, 5.3% did not go for follow-up treatments. As Malaysia is reported to have a high prevalence of the non-communicable disease, including hypertension and diabetes mellitus (for Public Health, 2015), this data is paramount. These chronic diseases may lead to complications such as heart attack, blindness and also amputation if they are not controlled and well-managed. Previous studies conducted among disease population

showed that their level of knowledge and awareness on chronic diseases remain moderate even though they consistently received relevant information from healthcare practitioners (Ding *et al.*, 2006) (Mahajan, 2012).

Majority of the participants with chronic diseases rely on healthcare personnel to gain information on the diseases. Even with the widespread use of mass and social media to spread knowledge and awareness about chronic diseases, this disease group especially the elderly population still rely on healthcare personnel to obtain information (Al-Dharrab *et al.*, 1996) (Nasir *et al.*, 2008). Thus, healthcare personnel, especially primary healthcare physician, must be updated on the knowledge of the diseases, their consequences, and proper management as this population depend merely on face-to-face education from healthcare personnel.

Interestingly, there was a higher number of urban participants who took traditional or supplementary medication. Previous studies have reported that the prevalence of conventional medicine usage in Malaysia was high with the odd increasing among Malay ethnicity, those being married and have higher income level (Aziz and Tey, 2009) (Sivanathan and Low, 2015). More studies shall be conducted on the use of traditional medicines together with generic medication as it may result in herb-drug interactions, and may also influence the medication regimen and therapy, especially in the disease group.

The World Health Organization defined traditional medicine as the total of the knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness (WHO, 2013). The traditional massage was the most common conventional treatment obtained by participants in both localities, followed by cupping therapy and Islamic medical practitioners. According to (Rahman *et al.*, 1987), the definition of massage or locally known as *urut* is the effective massage technique used by Malay traditional healers. Currently, traditional Malay massage had been integrated with public hospitals in Malaysia, which have been practising conventional and complementary medicine. The Ministry of Health had recognized this traditional technique in 2004 for the use of chronic pain and stroke (Abuduli *et al.*, 2011). Cupping therapy is also a standard traditional treatment used among Muslim as a treatment for cure. As narrated by Ibn 'Abbas, the Prophet Muhammad said, "Healing is in

three things: A gulp of honey, cupping and branding with fire (cauterizing). But I forbid my followers to use (cauterization) branding with fire." (The Hadith, n.d.).

A systematic review comparing the performance of private and public healthcare systems in low- and middle-income countries concluded that the public healthcare services and facilities were comparable to the production of private healthcare sector (Basu *et al.*, 2012). Results from this study also showed that the majority of the participants agreed that the accessibility to the public healthcare facilities in Malaysia was excellent in terms of distance, transportation and even the operational hour. The service to get treatments and medication was also excellent as agreed by the majority of the participants. However, due to the high volume of patients at public healthcare services, the waiting time is considered burdening for the participants, which are in agreement with the report by (Basu *et al.*, 2012).

Limitations

This study was limited to the first action that will be taken when the participants face any health problems. This may or may not reflect the actual work of health-seeking behaviour in different health conditions. This study was also limited to the Malay population living in the state of Negeri Sembilan; therefore the data cannot be generalized to all Malaysians in the country especially for traditional medicine used among other ethnic groups.

CONCLUSIONS

Most participants tend to consult public physicians as the first action to treat any health problems, followed by private physician. There is a small group within the population who would choose to consult pharmacists as the first action when faced with any health problems, while some others decided not to seek treatment. More studies on health-seeking behaviour in this group of people shall be conducted to explore the barriers in seeking treatment. The high prevalence of the use of traditional medicine shall also be studied with precaution. Overall, the accessibility towards public healthcare facilities and services in Malaysia is considered good as agreed by the majority of the respondents.

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Conflict of Interest

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

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Knowledge, attitudes and practices on risk factors of non-communicable diseases (NCDs): a cross-sectional survey among urban and rural adults in Negeri Sembilan, Malaysia

Muslimah Ithnin, Nadeeya 'Ayn Umairasara Mohamad nor, Norsham Juliana, Nadia Mohd Effendy, Mohd Azmani Sahar, Khadijah Hasanah Abang Abdullah, Muhammad Shamsir Mohd Aris & Mohd Dzulkhairi Mohd Rani

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Knowledge, attitudes and practices on risk factors of non-communicable diseases (NCDs): a cross-sectional survey among urban and rural adults in Negeri Sembilan, Malaysia

Muslimah Ithnin^a, Nadeeya 'Ayn Umairasara Mohamad nor^b, Norsham Juliana^c, Nadia Mohd Effendy^d, Mohd Azmani Sahar^e, Khadijah Hasanah Abang Abdullah^f, Muhammad Shamsir Mohd Aris^g and Mohd Dzulkhairi Mohd Rani^h

^aFaculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Kuala Lumpur, Malaysia; ^bDepartment of Primary Care, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Kuala Lumpur, Malaysia; ^cDepartment of Medical Science I, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Kuala Lumpur, Malaysia; ^dDepartment of Medical Science II, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Kuala Lumpur, Malaysia; ^eDepartment of Medicine Based Disciplines, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Kuala Lumpur, Malaysia; ^fDepartment of Surgical Based Disciplines, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Kuala Lumpur, Malaysia

ABSTRACT

Non-communicable diseases (NCDs) represent the foremost cause of mortality worldwide, including Malaysia. In this study, we aim to gauge the level of knowledge, attitudes, and practices on NCDs using a validated questionnaire. A descriptive cross-sectional study conducted among the general adult population in selected areas of Negeri Sembilan, Malaysia conducted from October 2017 to February 2018. Of the 486 respondents, 57.4% (279) were from rural communities. The mean age of the respondents was 53.68 (SD = 9.69). For both urban and rural respondents, more than half of the respondents showed good knowledge (78.7% vs 69.9%), good attitude (53.1% vs 93.2%), and moderate practice (63.8% vs 54.8%). In bivariate analysis, rural respondents have a significantly higher total attitude [66.01 (SD = 5.049) vs 57.18 (SD = 4.825), $p < 0.001$] and practice [7.65 (SD = 1.891) vs 7.24 (SD = 1.624), $p = 0.013$] scores than urban respondents with no significant difference in total knowledge scores. However, rural respondents had lower scores regarding general knowledge on NCDs [5.71 (SD = 2.288) vs 6.35 (SD = 1.587), $p = 0.001$] and diabetes mellitus diseases [2.91 (1.134) vs 3.24 (0.954), $p = 0.001$] compared to urban communities. This study identified that even with adequate knowledge, the attitude and practices towards NCDs were unsatisfactory, particularly among urban respondents. Considering the future burden of NCDs management and complication, efforts are needed to assess the factors that decrease the attitude and lifestyle practices in the prevention of NCDs, particularly among the urban community.

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CONTACT Mohd Dzulkhairi Mohd Rani drdzulkhairi@usim.edu.my Department of Community Health, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Level 14, Menara MPJ, Jalan Pandan Utama, Pandan Indah, Kuala Lumpur 56100, Malaysia

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Introduction

The enjoyment of the highest achievable standard of health is one of the requisite of every human being without boundary of race, religion and political belief, economic condition. According to the Lalonde model in 1974, biological, environmental, lifestyle, and organisational health care is the determinant factor of health (Hai 1986). Non-communicable diseases (NCDs) or more commonly known as chronic medical condition or illness are the result of a combination of genetic, physiological, environmental and behavioural factors (Trovato 2012; Kim and Oh 2013) that are firmly related to the factor of health determinants. Urbanisation, modernisation and globalisation have led to change not only in the economic structure but also epidemiological change with chronic diseases have been increasing in importance for the developed world including South East Asia region (Angkurawanon et al. 2014).

The most common non-communicable or lifestyle-related diseases are cardiovascular diseases, diabetes, and obesity (WHO 2011). According to the WHO report, NCDs are recognised as a significant disease burden to a developing country, including Malaysia (WHO 2018). Previously, these diseases were more prevalent among urban populations. However, because of urbanisation and a sedentary lifestyle, the communities in the rural areas are also facing an increasing prevalence of NCDs. A report by the Malaysia National Health Morbidity Survey (NHMS) on NCDs and risk factors in 2015 showed that the prevalence of hypertension in urban areas was 13.2% and 12.8%. Contradictory to this, the prevalence in urban and rural regions was 8.7% and 7.2%, respectively, showing a significant difference between localities for both diseases reported (Institute for Health 2015).

Until now, even though the importance and magnitude of NCDs are increasing, there is limited data on the level of knowledge, attitude, and practice (KAP) of NCDs among the general population in Malaysia. A literature search on knowledge about NCDs in this country has yielded very few studies. Most of the studies specifically focused on the level of knowledge and awareness of a more specific type of NCDs such as hypertension, diabetes mellitus (Ambigapathy, Ambigapathy, and Ling 2003; Ding, Teng, and 2006; Abdul-Razak et al. 2016; Ibrahim et al. 2016).

To the best of our knowledge, there have been no studies conducted in Malaysia looking into the differences in localities in correlation with KAP on NCDs. Such a study is fundamental to plan public health policies with specific reference to the implementation of the national program. Via understanding population knowledge, attitude, and practices, a better informed policy and public-health responses to the impact of the growing NCDs can be designed for the prevention of developing the diseases among the population in the future. This survey conducted to assess the level of knowledge, attitude and practices on NCDs among the adult population in a selected urban and rural area in the state of Negeri Sembilan and the differences between them.

Methods

Study design, sites and respondents' enrolment

A cross-sectional study conducted among the general adult's populations age 18 years old and above of Negeri Sembilan, Malaysia. Negeri Sembilan is a state in Ma-

laysia which lies on the western coast of Peninsular Malaysia. A stratified two-stage sampling method used to identify the villagers, whereas a participant's selection for the study conducted through convenience sampling. The urban study area of Ampangan is situated in the Seremban district, which is the capital city of Negeri Sembilan. Whereas, the rural study area of Pilah situated in the Kuala Pilah district, located 52 km from Seremban. The other rural study area Chennah is situated in the Jelebu district, 67 km from capital Negeri Sembilan. The study carried out from October 2017 until February 2018.

The sample size needed for reaching statistically significant results was determined using two population proportion formula. Therefore, the sample size was measured by exerting into account the hypertension prevalence in urban (13.2%) and rural (12.8%) area in Malaysian NHMS reported by Institute of Public Health Malaysia in 2015 and using open epi version 3.10.4 statistical package (Dean, Sullivan, and Soe 2011). According to the Department of Statistics, Malaysia (2010), the population count for the Ampangan area was 91 353. Whereas, the population count for Pilah and Chennah area was 37 580. At a 5% level of significance and a 95% confidence level, the minimum number of respondents required was estimated at 176 and 171, for the urban and rural area, respectively. Additional 10% was added to the sample size calculation to compensate for any missing or incomplete data. Therefore, the final sample size calculation for both urban and rural was 194 and 188, respectively.

Ethical approval obtained from the respective Research Ethics Committee and written informed consent obtained from respondents before the interview. This study carried out using a pre-tested, modified, validated questionnaire. The study conducted through a face-to-face interview in the subjects' houses.

The inclusion criteria for the respondents to take part in this survey was being a Malaysian citizen and residing in one of the selected areas, aged 18 years and above, and able to communicate in Malay. Respondents excluded if they have a terminal or psychiatric illness and communication disabilities.

Instrumentation

A detailed questionnaire used to obtain data regarding the respondents' demographic profile and chronic disease profile in part A. For chronic disease status, presence or absence of chronic diseases based on self-reported information on chronic conditions previously diagnosed by a medical professional. Respondents asked, followed by a list of chronic diseases, including hypertension, hypercholesterolemia, and diabetes mellitus, to which the answer is 'yes' or 'no' (Chan et al. 2015).

Knowledge in Part B and attitude in part C contained questions regarding NCDs adapted from WHO (2017) and Ithnin et al. in 2018. Knowledge section covers general knowledge regarding NCDs. In addition, questions on risk factors, disease management and preventive factors of major NCDs of cardiovascular disease of stroke and hypertension, diabetes mellitus and chronic obstructive pulmonary disease (COPD) also asked. Answers option included yes/no or correct/false questions with an additional option for unsure. The attitude towards NCDs was assessed based on the Likert criteria 'strongly agree' to 'strongly disagree' option. For determining their practice, the respondents' exercise activity, tobacco usage, alcohol drinking, vegetable consumption, body weighing

practice and stress management assessed (WHO 2017). The choices of the response 'frequent,' 'sometimes,' and 'never' for practice.

We approached five healthcare practitioners and academics for the content validity of the instrument and a pre-test with thirty respondents who had a similar profile to target population conducted to verify the reliability of the questionnaire. Cronbach coefficients used to evaluate the reliability of the knowledge and attitude its Cronbach's α coefficient for knowledge and attitude is 0.700 and 0.765, respectively. Following the content validity of the questionnaire by experts, and face validity through a pre-test study, from which a few corrections and amendment made to improve questionnaire.

Scores of KAP regarding NCDs

Each of the knowledge, attitude and practice categories consisted of 27, 15 and questions, respectively. The scoring system was adapted and modified from previous studies (Karim et al. 2008; Chong, Appannah, and Sulaiman 2019). Responses of correct and wrong/unsure for knowledge section given the scores of 1 and 0, respectively. Responses of 'strongly disagree', 'disagree', 'neutral', 'agree', and 'strongly agree' based on positively attitude statements were given the scores of 1, 2, 3, 4, and 5, respectively. Whereas responses of 'frequent,' 'sometimes,' and 'never' for practice in given the scores of 2, 1 and 0, respectively.

The raw scores converted to a percentage for KAP categorization. Minimum score for knowledge, attitude and practice were 0, 15 and 0, respectively, and maximum score were 28, 75 and 12, respectively. The knowledge, attitude and practice categorized as: poor (0-50%), moderate/fair (51-75%) and good (76-100%).

Data analysis

The data was coded and transferred to IBM Statistical Package for the Social Sciences (SPSS) for window version 23 for analysis. All descriptive data presented as percentages or means and standard deviations. Chi-Square test used to determine the association of localities with diseases status. Whereas, independent t-test used to determine association between KAP scores and localities. Statistical significance set p -values <0.05 .

Results

Demographic characteristic

A total of 486 respondents were involved in this interview with 207 (42.6%) and 279 (57.4%) respondents from urban and rural affluent communities, respectively. complete socio-demographic characteristics of the respondents presented in Table 1. The mean age for all the respondents was 53.68 (SD = 19.69), ranging from 18 to 89 years old. More than half of the respondents were female (58.2%). Half of the respondents had education in secondary school (50.0%), and many of them were unemployed (66.3%). The mean household income among urban communities was higher with Ringgit

Table 1. Descriptive information on the sample population, disaggregated by age, gender, educational level and employment status by location (n = 486).

Variable	n (%)		
	Total	Urban	Rural
Age (year olds)			
18-40	125 (25.7)	55 (26.6)	70 (25.1)
41-60	171 (35.2)	61 (29.5)	110 (39.5)
60 Above	190 (39.1)	91 (44.0)	99 (35.5)
Gender			
Male	200 (41.2)	76 (36.7)	124 (44.4)
Female	286 (58.2)	131 (63.2)	155 (55.6)
Education			
No formal education	21 (4.3)	4 (1.9)	17 (6.1)
Primary School	141 (29.0)	57 (27.5)	84 (30.1)
Secondary School	243 (50.0)	107 (51.7)	138 (49.4)
Tertiary schooling	78 (16.0)	40 (19.3)	38 (13.6)
Others	3 (0.6)	1 (0.5)	2 (0.7)
Employment			
Unemployed	322 (66.3)	152 (73.4)	170 (60.9)
Employed	164 (33.7)	52 (26.6)	109 (39.1)

Malaysia (RM) 1974 (SD = 1930) than in rural with RM1552 (SD = 1606) that equivalent to United States Dollar (USD) 471 and 370 USD, respectively.

Diseases profile of the respondents

The summary of the chronic diseases by localities summarised in Table 2. The disease of hypertension (34.2%) was the highest, followed by hypercholesterolemia (27.8%) and diabetes mellitus (17.9%) for all the respondents and both localities. There are higher percentages of rural (30.5%) respondents with hypercholesterolemia than urban (24.2%). Whereas for diabetes mellitus, higher percentages of self-reported with diseases in urban (20.3%) compared to rural (16.1%). However, no significant difference found for all the diseases across localities.

Knowledge of respondents regarding NCDs

The association between KAP and localities is shown in Table 3. The mean total score of knowledge regarding NCDs among the respondents was 22.72 (SD = 5.634), which was at a good level. The results showed that majorities of the participant from rural and urban had high knowledge categories with no significant difference in knowledge scores across localities. Regarding general knowledge on NCDs, rural respondents had significantly

Table 2. Comparison of chronic disease status between urban and rural using chi-square test (n = 486).

Disease status	n (%)			P-value
	Total	Urban	Rural	
Hypertension	166 (34.2)	71 (34.3)	95 (34.1)	0.954
Hypercholesterolemia	135 (27.8)	50 (24.2)	85 (30.5)	0.125
Diabetes Mellitus	87 (17.9)	42 (20.3)	45 (16.1)	0.237

Table 3. Comparison of knowledge, attitude and practice scores regarding NCDs between urban and rural using independent t-test (n = 486).

Aspects	n (%)		Mean (SD) score		P-value
	Urban	Rural	Urban	Rural	
Knowledge					
General knowledge (Q1-7)					
Low	24 (11.6)	79 (28.3)	6.35 (1.587)	5.71 (2.288)	0.001*
Moderate	74 (35.7)	62 (22.2)			
High	109 (52.7)	138 (49.4)			
Heart attack (Q8-11)					
Low	23 (11.1)	32 (11.5)	3.55 (0.839)	3.54 (1.048)	0.926
Moderate	38 (18.4)	30 (10.8)			
High	146 (70.5)	217 (77.8)			
Stroke (Q12-15)					
Low	38 (18.4)	35 (12.5)	3.353 (1.032)	3.448 (1.183)	0.354
Moderate	37 (17.9)	34 (12.2)			
High	132 (63.8)	210 (75.3)			
Hypertension (Q16-19)					
Low	34 (16.4)	49 (17.6)	3.32 (0.878)	3.31 (1.175)	0.913
Moderate	63 (30.4)	48 (17.2)			
High	110 (53.1)	182 (65.2)			
Diabetes mellitus (Q20-23)					
Low	35 (16.9)	68 (24.4)	3.24 (0.954)	2.91 (1.134)	0.001*
Moderate	71 (34.3)	116 (41.6)			
High	101 (48.8)	95 (34.1)			
Chronic Obstructive Pulmonary Disease (Q24-27)					
Low	33 (15.9)	39 (14.0)	3.37 (1.318)	3.48 (1.291)	0.360
Moderate	16 (7.7)	4 (1.4)			
High	158 (76.3)	236 (84.6)			
Total Knowledge regarding NCDs (Q1-27)					
Low	16 (7.7)	27 (9.7)	23.17 (4.582)	22.38 (6.289)	0.129
Moderate	28 (13.5)	57 (20.4)			
High	163 (78.7)	195 (69.9)			
Attitude					
Towards NCDs behavioural risk (6 items)					
Low	12 (5.8)	0	22.25 (2.505)	26.18 (2.162)	<0.001
Moderate	160 (77.3)	63 (22.6)			
High	35 (16.9)	216 (77.4)			
Towards NCDs management (6 items)					
Low	8 (3.9)	3 (1.1)	23.68 (2.110)	26.23 (2.954)	<0.001
Moderate	133 (64.3)	54 (19.4)			
High	66 (31.9)	222 (79.6)			
Towards support network (3 items)					
Low	34 (16.4)	14 (5.0)	11.25 (2.003)	15.60 (2.065)	<0.001
Moderate	134 (64.7)	77 (27.6)			
High	39 (18.8)	188 (67.4)			
Total attitude regarding NCDs (15 items)					
Low	2 (1.0)	0	57.18 (4.825)	66.01 (5.049)	<0.001
Moderate	159 (76.8)	39 (14.0)			
High	46 (22.2)	240 (86.0)			
Practices					
Total Practice regarding NCDs behavioural risk (6 items)					
Low	72 (34.8)	76 (27.2)	7.24 (1.624)	7.65 (1.891)	0.013
Moderate	117 (56.5)	152 (54.5)			
High	18 (8.7)	51 (18.3)			

Low (050%), Moderate (5175%), High (76100%).

lower mean knowledge score than urban respondents [5.71 (SD = 2.288) vs 6.35 (SD = 1.587), $p = 0.001$]. Besides, rural participant also had a significantly lower mean knowledge score regarding diabetes mellitus than urban respondents [2.91 (SD = 1.134) vs 3.24 (SD = 0.954), $p = 0.001$]. On the other hand, no significant differences found for mean knowledge scores for knowledge regarding heart attack, stroke, hypertension and COPD

Attitude of respondents regarding NCDs

The results showed that the mean total score of attitude regarding osteoporosis for the respondents was 62.25 (SD = 6.604), which was at a good level. In the NCDs behavioural risk statement, it found that urban respondents had a significantly lower mean attitude score [22.25 (SD = 2.505) vs 26.18 (SD = 2.162), $p < 0.001$]. Additional to that, more than half of the urban respondents in moderate category and rural respondents in high category of 77.3% and 77.4%, respectively.

On the other hand, for attitude towards chronic diseases management, the majority of urban respondents in the moderate category (64.3%), whereas the majority of rural in high attitude category (79.6%). Moreover, rural respondents had significantly higher mean attitude scores in chronic diseases management than urban [26.23 (SD = 2.954) vs 23.68 (SD = 2.110), $p < 0.001$]. In term of network support, rural respondents had significantly higher mean attitude scores in giving support for diagnosis, care and financial assistant than urban respondents [13.60 (SD = 2.065) vs 11.25 (SD = 2.003), $p < 0.001$] with the majority of rural respondents in high attitude (67.4%) towards support network category. The total attitude means the score was significantly lower in urban compared to rural respondents [57.18 (SD = 4.825) vs 66.01 (SD = 5.049), $p < 0.001$].

Practices of respondents regarding NCDs

The mean total score of practice regarding NCDs risk among the respondents was 7.47 (SD = 1.792), which was at the moderate/fair level. Among the respondents, only 8.7% of urban and 18.3% of rural in good practices categories with more than half of respondents from both localities in moderate practices group category. In addition, the total mean practices scores are significantly lower among urban respondents compared to rural [7.24 (SD = 1.624) vs 7.65 (SD = 1.891), $p = 0.013$].

Discussions

This study sought to assess the knowledge, attitude, and practice of non-communicable diseases among selected urban and rural populations in Malaysia. Findings from this study showed that the three most common NCDs reported were in line with a report published by the Malaysian NHMS in 2015 (Institute for Public Health 2015). The associated diseases were hypertension, hypercholesterolemia, and diabetes mellitus. However, the percentages reported in this study was higher compared to the report. These might be due to most of the respondents involved in this survey were aged above 40 and the prevalence of NCD increases with age (Chan et al. 2015).

There was also no significant association between localities found in both the current study and the 2015 NHMS report (Institute for Public Health 2015). This situation is worrying as these diseases, which most commonly correlated to lifestyle diseases among the urban population is also dominant among rural communities as well. These may result in a substantial negative impact to the economy and society of developing countries including Malaysia as the diseases usually affect people between the age group of 45 to 64 years and those in their peak lives (Muka et al. 2015).

ORCID

Muslimah Ithnin  <http://orcid.org/0000-0002-0557-907X>Mohd Dzulkhairi Mohd Rani  <http://orcid.org/0000-0003-1915-4862>

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Most of the respondents in this study showed good knowledge towards NCDs with no significant difference in knowledge scores for both localities. Results also showed that most of the respondents had good knowledge and attitude towards NCDs. However, most of the respondents had only moderate practice toward preventing NCDs activity. Interestingly, there was a significantly higher attitude and practice score in rural communities as compared to urban people when localities compared within this study.

Several studies conducted on specific types of NCDs in Malaysia, such as on hypertension, cardiovascular disease and diabetes mellitus also reported satisfactory levels of knowledge (Ambigapathy, Ambigapathy, and Ling 2003; Ding, Teng, and Koh 2006; Abdul-Razak et al. 2016). In a study conducted by Al-Naggar et al. in 2017 reported a good score towards diabetes mellitus in the urban area of Malaysia. Contrasty, in studies (Rosmini Romaji, Zakaria, and Yusof 2017; Abbasi et al. 2018), conducted in rural Malaysia reported the level of knowledge towards diabetes mellitus was moderate as also shown from our study.

The attitude of urban communities regarding NCDs behavioural risk, disease management including lifestyle change and also support network is lower than rural communities. Referring to De Souza, Williams and Meyerson model (2003), there is a critical link between population, environment and health. As the population rely on the environmental factor, which also the factor of health determinant (Hancock 1986), this limitation reduced the positive attitude on health among the urban communities.

Current scientific evidence has also shown that increasing knowledge and awareness alone do not guarantee behavioural modification (Potvin, Richard, and Edwards 2000; Ibrahim et al. 2016). The unhealthy environment associated with a sedentary lifestyle, lack of exercise, excess dietary intake of sodium and fat and poor diet with a stressful life are challenging factors for urban to populate to implement and maintain a good standard of living (Noor 2002). Besides, a study by Lim and Taylor in 2005 found that living in a rural area is independently associated with adequate physical activity as compared to an urban area. Among the factors contributing to this occurrence include environmental factors such as more open and green space, the presence of enjoyable scenery in the neighbourhood in addition to the elements of less traffic may influence residents in rural areas to participate in a healthy lifestyle (Wilcox et al. 2000; Fernandez et al. 2019).

Knowledge does not always demonstrate a significant association between both attitude and practice, as also shown in this study. Even though their knowledge of the disease was high, the attitude and practice have remained low, especially in urban communities. Since behavioural risk factors contribute to developing NCDs, the use of public awareness, healthy diet and lifestyle education with law and regulatory enforcement to disseminate information regarding risk factors and consequences of NCDs to the target population recommended (Mahajan et al. 2012; Elnaem, Jamshed, and Elkalmi 2019) in reducing the public health burden in the future.

To increase the positive attitude and practices among urban, the conducive environment for the communities to undergoing a healthy and balanced lifestyle is essential (Ahmad, Ahmad and Abdullah 2009; Mansor and Harun 2014). Besides, continuous education on a healthy lifestyle and regular check-ups at all levels of age and society to increase their knowledge of the disease is beneficial. In today's world, the use of media such as social media can offer opportunities for the modification and intervention of

health behaviour as it considered as a potential tool for health promotion and education (Korda and Itani 2013; Ithnin et al. 2017).

Limitations

Some limitations of this study shall be considered. First, this study adopts a cross-sectional design which does not allow for the determination of causal effect relationships. Secondly, the study population also had more females and older individuals. These may be because males and younger respondents were working during the time of the survey conducted. Future research is warranted to obtain data from multiple states as this study only covered one state in Malaysia, which is Negeri Sembilan.

Conclusion

Finding from this study show that the levels of knowledge and attitude were equally adequate among urban and rural populates of Negeri Sembilan, but the practices were low. The attitude and practice score among rural communities is significantly higher as compared to those in the urban area. An in-depth qualitative study is needed to understand the underlying factors for unsatisfactory practice. Future studies are also highly recommended for a better assessment of the elements that decrease lifestyle behaviour in an urban population. Education to increase the knowledge regarding the disease and the importance of good lifestyle practice in preventing the occurrence of NCDs are also essential to reduce the prevalence of NCDs in the community.

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Disclosure statement

The author(s) declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

Ethics clearance

Ethical approval obtained from the Research Ethics Committee, Universiti Sains Islam Malaysia with reference number USIM/JKEP/2017-27.

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Knowledge, Attitude and Practices Towards Lifestyle Related Non-Communicable Diseases (NCDs): A Cross Sectional Study among Indigenous Orang Asli Adults Negeri Sembilan, Malaysia

Ithnin M^a, Nor NAUM^b, Juliana N^c, Effendy NM^d, Sahar MA^e, Abdullah KHA^f, Aris MSM^g, Rani MDM^h

^aFaculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia

^bDepartment of Primary Care, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia

^cDepartment of Medical Science I, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia

^dDepartment of Medical Science II, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia

^eDepartment of Medicine Based Disciplines, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia

^fDepartment of Surgical Based Disciplines, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia

ABSTRACT

INTRODUCTION: An increase in the prevalence of non-communicable diseases (NCDs) among Orang Asli Malaysia was reported to be associated with their lifestyle changes. This study aimed to determine the demographic factors of knowledge, attitude, and practice (KAP) on NCDs among the Orang Asli community and its associated demographic factors of gender, age, and education level. **MATERIAL AND METHODS:** A cross-section among consented adult Orang Asli in Jelebu, Negeri Sembilan, was conducted by a face-to-face interview using a validated questionnaire. Their knowledge, attitude, and practice on selected NCD risk complications, and treatment was recorded. Bivariate analysis was performed to test the association between their demographic profile and KAP score. **RESULTS:** A total of 325 respondents with a mean age of 39.9 (±13.2) ranged from 18 to 83 years old participated in this study. Majority of the participants had inadequate knowledge. Despite the inadequacy, they have a good attitude (72.3%) and a fair practice level (63.4%). Respondents with higher education backgrounds had significantly better knowledge scores compared to lower education background ($p < 0.001$). Female respondents had better practice than male respondents ($p = 0.001$). **CONCLUSIONS:** The study shows that the level of knowledge among Orang Asli is low with a moderately healthy lifestyle. Improving the Orang Asli understanding and prevention by incorporating health programs regularly in their community is a strategic method to increase their awareness. Hence, escalating their good practice on NCDs and eventually their health.

KEYWORDS: knowledge, lifestyle, Orang Asli, Malaysia, non-communicable diseases

INTRODUCTION

Orang Asli (literally, original people) is the collective term for the indigenous peoples of Peninsular Malaysia.¹ Orang Asli classified into three main ethnolinguistic groups, namely the Senoi, Proto-

Malays or Aboriginal Malays, and the Negrito, consisting of different dialectic subgroups in different geographical locations.¹ Orang Asli is the smallest group in Malaysia, which account for less than 1% of the total population in Malaysia.² The transformation occurring to Orang Asli in the economic, physical, and capital development given rise to many effects in the life of this society which includes financial, religion, education, communication, and health.

The World Health Organization (WHO) defines the quality of human life is determined by physical, biological, chemical, social, and psychological factors.³

For the Orang Asli communities, the changing environment and health factors have impacted their quality of life and exposed the Orang Asli community to the diseases that are more prevalent among urban populations.⁴ Studies among Orang Asli reported that there was a change of disease trends from infectious to non-communicable diseases (NCDs), especially among Orang Asli living in the fringe and urban areas.^{4,6} Already burdened with poorer health compared with the national population, studies show that there is a growing problem of NCDs among the Orang Asli.^{7,8} Exposing them to NCDs that are also known as a lifestyle or preventable chronic diseases, will eventually increase the burden to this marginalised and vulnerable group of communities.^{1,9}

The shift to more urban life, added with their low education level, little knowledge on diseases, and lack of accessibility to healthcare facilities expose them to the threat of mismanagement and complications of NCDs.¹⁰ These chronic diseases exert a substantial economic burden on this society, and the Malaysian healthcare system is also facing increasing pressure to provide universal health care coverage, particularly for the Orang Asli population.¹¹

Studies on knowledge, attitude, and practices are essential so that continuous education and intervention program can be conducted mainly to the group who are at risk.^{12,13} Previous studies reported that among the three groups of Orang Asli, Proto-Malays had poor knowledge of diabetes despite their close accessibility to the city and had among the highest prevalence of NCDs.^{4,10}

From literature search until date, there is no study published on knowledge, attitude and practices towards NCDs among Orang Asli, particularly for the most significant contributor of NCDs in Malaysia, which is cardiovascular diseases, diabetes, cancer, and chronic pulmonary diseases.¹⁴ These NCDs share the common behavioural or lifestyle risk factors of tobacco use, alcohol consumption, physical inactivity, and also unhealthy diet.¹⁵ Therefore, analysing their current state of understanding of the lifestyle diseases and also their attitude and practices will eventually assist in future intervention and education programs that can be designed to suit the need of Orang Asli communities.

The purpose of this study was to evaluate the knowledge, attitude, and practices towards lifestyle-related NCDs among indigenous people of Orang Asli in Jelebu district of Negeri Sembilan, Malaysia, and to determine the significant relationship between the socio-demographic characteristics of the Orang Asli with their knowledge and attitude level.

MATERIALS AND METHODS

Study design

This cross-sectional study was conducted from January to December 2018 among the Orang Asli population in Jelebu district of Negeri Sembilan state in Peninsular Malaysia. Jelebu is the second largest district in Negeri Sembilan and located 99 km from the capital of Malaysia, Kuala Lumpur. Most of the Orang Asli population in Jelebu was from the Temuan subtribe of the Proto-Malay tribe.¹⁶

The selection of villages was conducted using the systematic sampling method according to the Orang Asli village list provided by the authority. Participants were recruited using the purposive and snowballing sampling method based on the defined inclusion and exclusion criteria.

The total population of Orang Asli in Jelebu, Negeri Sembilan updated in 2010 was 2475, including those aged below 18.¹⁷ The calculated sample size using Krejcie and Morgan (1970), was 331 with the assumed population proportion of 0.05 and 95% confidence interval.¹⁸ The total number of respondents chosen for this study was 364, after taking into consideration the 10% non-response rate. However, at the end of the research period, the total respondents were 325.

Inclusion and exclusion criteria

The inclusion criteria were Malaysian citizens with Orang Asli ethnicity, age 18 and above who provided informed consent. Participants with documented psychiatric illnesses, or do not understand Malay language or healthcare personnel were excluded to reduce bias.

Study instruments

A guided, face-to-face interview was carried out through a structured questionnaire. The interview

Corresponding Author:
Assoc. Prof. Dr. Mohd Dzulkhairi Mohd Rani
Department of Primary Care,
Faculty of Medicine and Health Sciences,
Universiti Sains Islam Malaysia,
Menara B, Persiaran MPAJ,
Jalan Pandan Utama, Pandan Indah
55100 Kuala Lumpur, Malaysia
Tel No: +603 42894 200
Email: drdzulkhairi@usim.edu.my

session was conducted using the local language (Malay) for the ease of communication between the researcher and the participants. The survey consisted of four sections. The questionnaire was adapted from a validated questionnaire by Ithnin et al. (2018) in a study "Knowledge, attitude and practices on non-communicable diseases among the adult population in the urban area of Negeri Sembilan, Malaysia" done in 2018.¹⁹

For the content validity of the questionnaire, a panel of experts assessed the questionnaire to verify the content and relevancy of the questions. A pilot study was conducted among 30 Orang Asli residents from the Temuan tribe in Selangor, Malaysia who had similar community profile with the study population. Cronbach's alpha test was used to assess the internal consistency of the questionnaire. The Cronbach's alpha test for all items was as follows; knowledge on NCDs (0.961), attitude towards NCDs (0.898), and practice on lifestyle-related NCDs (0.705), which showed excellent internal consistency.²⁰

The first section detailed on socio-demographic of the participants, which included age, gender, and education level. These factors used as the independent variables in this study. As for the dependent variables, knowledge, attitude and practices scores used as the outcome. These factors were included based on the literature reviews from previous papers with the hypotheses that they have a significant relationship with knowledge, attitude and practices towards lifestyle-related NCDs.^{10, 19}

There were 27 questions in the second part of the knowledge section. Their knowledge of risk factors, complications, and treatment of cardiovascular diseases, diabetes mellitus, and chronic obstructive pulmonary diseases asked. The correct answer for each question in the knowledge section was given one mark while the wrong answer or 'did not know' answers given zero marks. The total score of knowledge ranged from zero to 28 marks. Score zero to 14 categorised as poor, score 15 to 21 as moderate, and score 21 to 28 as having good knowledge.

For the attitude section, there were a total of 15 questions, and answers were in Likert scoring form with a more positive attitude carry a higher score from one to five. Score zero to 38 categorised as poor

attitude, score 39 to 56 as moderate, and 57 to 72 as good attitude category.

The final section was to assess the lifestyle-NCDs practices, specifically on physical activity, smoking status, alcohol consumption, body stress management and fibre intake. These 12 practices identified by the World Health Orgar [WHO, 2017].¹⁵ The total score of practices from zero to twelve marks. practices score less than six was considered poor, 7 to 9 moderate, and 10 to 12 having a good practices.

Ethical issues

Before the collection of the data, an ethical approval was obtained from the Malaysia Medical Research Ethics Committee [NMRR-18-3111-44674 (IR)] purpose and procedures of the study were explained to and approved by the Malaysian Department of Health [JAKOA/PP.30.052/JL]. Before the interview, an information about the study was given to the participants and written in consent obtained from those who consent to participate. As the participation was voluntary, the participants had the right to stop participating in this study at any time and had the right to answer any question that made them feel uncomfortable. The participants were assured throughout the study.

Statistical analysis

Data analyses were executed using IBM SPSS 23.0 with descriptive analysis using frequencies, percentages, mean, and standard deviation. Histogram with normality curve and Kolmogorov-Smirnov test was used to check for the normality of data in this study. Since the data was not normally distributed, the non-parametric test for inferential analysis. The association between demographic factors with knowledge, attitude and practices status were analysed using the Chi-square test for two categorical variables. A Kruskal-Wallis test used for more than two categorical variables. Pearson correlation coefficient and scatter plot were performed to check the relationship between knowledge, attitude and practices score. Results were significant if the p-value was less than 0.05.

RESULTS

Demographic characteristics of the sample population

The survey was conducted among 325 participants and the demographic characteristics of the participants is summarized in Table I. The mean age was 39.94 ± 13.196 years old, ranged from 18 to 83 years old. Only 4.0% of participants received tertiary education and 24.9% received secondary education, while majority of them received primary education or has no formal education (39.1% vs 32.0%).

Table I Socio-demographic of the participants (n = 325)

Characteristics	n	(%)
Age category		
18-39	176	54.2
40 and above	149	45.8
Gender		
Male	94	28.9
Female	231	71.1
Educational Level		
No formal education	104	32.0
Primary education	127	39.1
Secondary education	81	24.9
Tertiary education	13	4.0

Knowledge, attitude and practices score towards lifestyle-related NCDs

Results in Figure 1 show the knowledge and attitude level categories. In general, most of the participants have inadequate knowledge level (72.3%), good attitude level (72.3%), and moderate practices level (63.4%). Only 16.0% of the participant has a good practices category. The mean score of knowledge among the participants is 12.82 ± 9.671, while the

mean score of attitudes among the participants is 59.81 (SD= 6.237). The mean score for practices is 7.66 (SD=1.780).

Association between demographic factors with knowledge, attitude and practices status

Table II shows the results of statistical analysis to compare the knowledge, attitude, and practices regarding lifestyle-related NCDs with socio-demographic categories of gender, age group, and education level. There is a significant difference in knowledge scores in education level with higher education levels has significantly higher knowledge scores compared to lower education level (p<0.001). There are no significant differences in knowledge between gender (p=0.791) and age group (p=0.210). All the p values are more than 0.05, indicating that there are no significant differences in attitude score regarding lifestyle-related NCDs between the groups of gender (p=0.662), age (p=0.739), and education (p=0.333). Females have significantly higher practices scores compared to males (p=0.001). Variables of age and education level show no significant difference with p=0.199 and p=0.659, respectively.

Correlation between knowledge status with attitude and status

A Pearson correlation coefficient was computed to assess the relationship between the total knowledge score with attitude and practices score. Overall, there is a weak positive correlation between



Figure 1 Knowledge, attitude and practices category among participants (n=325)

Table II Comparison of total scores of knowledge, attitude and practices regarding lifestyle-related NCDs between different socio-demographic factors (n=325)

Groups being compared	Knowledge		Attitude		Practices	
	Scores	p value	Scores	p value	Scores	p value
Gender:						
Male	13.5(19)	0.791*	60 (9)	0.662*	7 (3)	0.001**
Female	13.0(20)		60 (8)		8 (2)	
Age:						
18-39	15 (19)	0.210*	60 (9)	0.739*	8 (2)	0.199*
40 and above	13 (20)		60 (8)		7 (2)	
Education level:						
No formal education	6 (17)	<0.001**	60 (10)	0.333*	8 (2)	0.659*
Primary	13 (19)		60 (8)		7 (2)	
Secondary	18 (16)		60 (8)		7 (2)	
Tertiary	24 (7)		62 (4)		8 (2)	

Scores expressed as Median (±IQR)
 p values based on comparisons between groups at a single time-point (* Mann-Whitney test; ** Kruskal Wallis test)
 † Significant association

knowledge and attitude scores. Increases in available and males were more reluctant to participate in the survey. The similar trends were seen in the numbers of studies conducted among the *Orang Asli* population.^{10, 23-25} A proportion of the participants were younger adults, with the age range of 18-39 years. For the educational level, most of the participants only attain primary education (39.1%), and 32.0% of them have never received any formal education.

DISCUSSION

Non-communicable diseases (NCDs) have become a significant problem in many developing countries as the population is experiencing an epidemiological transition from infectious to non-communicable chronic diseases, including the indigenous group.^{21, 22} NCDs is a silent threat to the health of people around the world and also a significant cause of worldwide preventable morbidity and mortality.¹⁵ Report by Malaysia National Health Morbidity Survey in 2015 also showed a worrying prevalence number of underdiagnosed NCDs among *Bumiputera Asli*, which include the *Orang Asli* group from Peninsular Malaysia.¹⁴ The prevalence of underdiagnosed hypertension is 17.6 %, and for underdiagnosed diabetes mellitus is 8.1%.¹⁴ As the prevalence of NCDs continues to rise not only in the general population but also to the *Orang Asli* population²³, it will burdening the community and also the Malaysian government.

Socio-demographic characteristics

Most of the participants were female as during the time of the interview, only women were mostly

In the present education system, *Orang Asli* children attend the Malaysian public school for their formal education. The older generation did not have the same chance for schooling due to limited accessibility to the public school in the previous years. Therefore, many of the adults did not attain any formal education. The problem of dropout from primary to secondary school among *Orang Asli* children are still severe.²⁶ It reported that 22.09% of *Orang Asli* kids in 2014 who finished primary school did not enrol in secondary school.² Those with higher education were expected to have a better level of knowledge and attitude regarding lifestyle-related NCDs.

Knowledge, attitude and practices towards lifestyle-related NCDs

The lifestyle-related NCDs that explored in this study, which are cardiovascular disease, diabetes, and chronic respiratory disease, are the most common burden to healthcare worldwide due to long-term management and complication.¹⁵ Poor knowledge regarding these diseases may result in a bad attitude and poor practices and ignorance of a healthy lifestyle. The results from this study show that the

level of knowledge regarding lifestyle-related NCDs is poor amongst the *Orang Asli* interviewed. Only 25.8% of them had a good understanding of lifestyle-related NCDs. Many of the participants failed to answer the question correctly. From the maximum score of 27, their mean total score of knowledge is 12.82(SD=9.671). Another study exploring the understanding of diabetes disease among *Orang Asli* also reported poor knowledge scores among them.¹⁰

The participants in this study were found to have an excellent attitude towards preventing lifestyle-related NCDs. Most of them have a good attitude with a mean attitude score of 59.81 (SD=6.237). The maximum rating is 75. Almost all of them also agreed that prevention of disease is vital. This result supports a previous study on infectious disease among *Orang Asli*, which reported a positive attitude among them.^{27, 28}

Association between knowledge, attitude and practices regarding lifestyle-related NCDs with socio-demographic characteristics

In relation to the understanding of symptoms, risk factors, prevention, management and complication of NCDs, most participants failed to identify the correct answer. The results indicated that participants who had higher formal education had significantly higher knowledge scores. Similarly, a previous study also showed that the better the educational level contributes to a higher KAP level on soil-transmitted helminth infections among *Orang Asli* in rural Malaysia.²⁸ Several studies reported that the risk of getting NCDs was firmly related to the education background.^{22, 25}

As shown from the finding of the study, the female has significantly better practices scores than the male gender. Physically active, not consuming alcohol, and not smoking are protective factors for lifestyle-related NCDs.¹⁵ For the female respondents, they are less exposed to these unhealthy activities compared to males. Therefore, they have better practices scores than males. Hence, our finding implies that improving the level of education in the *Orang Asli* community will probably increase the ability of people to understand the diseases. Additional to that, males should be a target group in the prevention of NCDs so they will be eventually able to develop a healthy lifestyle.

Correlation between knowledge, attitude and practices regarding lifestyle-related NCDs

There was a significant, but fair, positive relationship between the total knowledge and attitude and practices score. Based on the correlation between knowledge and attitude regarding lifestyle-related NCDs among the participants, it was found that higher knowledge contributed to a better attitude and practices. This result implied that someone who knew more about the disease had a better attitude and practices towards the prevention of the disease. The finding is consistent with studies that found a significant correlation between knowledge, attitude, and practices regarding the illness of soil-transmitted helminth infections and malaria among the study population of *Orang Asli*. Even though they had poor knowledge of the disease, their attitude was positive.^{27, 28}

Limitation and Future Agenda

Due to the shy nature of the *Orang Asli* population and the small number of residents in each village, it is often hard to reach the people to be selected. A snowball sampling method was also applied during recruitment because the procedure is quicker to recruit subjects when compared with probability sampling. Both purposive and snowball sampling approaches are non-random sampling methods that may have limitations but generally used in *Orang Asli* research.^{8, 29}

The present study provides a community-based picture of the KAP on lifestyle-related NCDs among *Orang Asli* people in Jelebu, Negeri Sembilan. Poverty and underdevelopment are the predominant features of *Orang Asli* communities, and education levels still lagging compared to other communities. Hence, we believed that even though this study cannot be generalized to the whole *Orang Asli* communities, it reveals the need for future research into better methods for implementation of interventions, especially among these vulnerable populations, and to find pragmatic and innovative solutions to increase their knowledge and practices that will eventually reduce their risk of developing NCDs in the future.

CONCLUSION

From this study, several findings inferred with essential implications for lifestyle-related behaviour among the *Orang Asli* population. Firstly, the results indicate that the level of knowledge about NCDs risk factors, disease management and complication among the participants was low, and their practices on prevention of NCDs was moderate. Secondly, differences in knowledge scores influenced by their education background. Thirdly, the practices score was higher in the female gender. Hence, the findings of this survey will assist the health authorities and researchers in establishing more evident knowledge, attitudes, and practices of the population concerning NCDs. Thus, permitting the use of competent tools for health education and sustaining appropriate practices for NCDs prevention. Even though it might be challenging, educational and health programs on enhancing NCDs knowledge and practices will be beneficial for the *Orang Asli* communities in Malaysia.

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The authors declare that there is no conflict of interest.

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ORIGINAL ARTICLE

KNOWLEDGE, ATTITUDE, AND PRACTICES OF NON-COMMUNICABLE DISEASES: COMPARISON ORANG ASLI AND MALAY FROM RURAL AREA IN NEGERI SEMBILAN, MALAYSIA: A COMPARATIVE STUDY

Muslimah Ithnin¹, Norsham Juliana², Nadeeya 'Ayn Umaisara Mohamad Nor³, Nadia Mohd Effendy⁴ and Mohd Dzulkhairi Mohd Rani³

¹Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Kuala Lumpur, Malaysia.

²Department of Medical Science I, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Kuala Lumpur, Malaysia

³Department of Primary Care, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Kuala Lumpur, Malaysia

⁴Department of Medical Science II, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Kuala Lumpur, Malaysia

Corresponding author: Mohd Dzulkhairi Mohd Rani

Email: drdzulkhairi@usim.edu.my

ABSTRACT

The study evaluates the prevalence, knowledge, attitude, and practices of non-communicable diseases (NCDs) among adult Orang Asli and Malay ethnicity in Negeri Sembilan, Malaysia. This cross-sectional study involving 634 respondents aged 18 years and above of Orang Asli (51.3%) and Malays (48.7%) from the rural villages. Structured interview questionnaire for disease history and KAP level conducted. Weight, height, waist circumference, blood pressure, and blood glucose levels then measured. Prevalence of NCDs was higher among Malays compared to Orang Asli with hypertension (35.0% vs 14.8%), hypercholesterolemia (31.1% vs 5.2%), and diabetes mellitus (16.2% vs 4.3%), respectively. Malays also had a higher percentage of being abdominal obese (70.6% vs 59.7%) and increased blood pressure (54.4% vs 29.8%). Multivariate analysis indicates hypercholesterolemia [OR=6.035 (95%CI: 3.150, 11.561)], abdominal obesity [aOR= 1.807 (95%CI: 1.065, 3.067)], and increased in blood pressure [aOR= 2.359 (95%CI: 1.619, 3.437)] have a significant relation with Malay ethnicity. For Orang Asli, 51.7% had poor knowledge, 72.3% had a good attitude, and 16.0% had a good practice. Knowledge and attitude scores were significantly less among Orang Asli with no significant difference for practice compared to the Malays. The prevalence of NCDs among the Malays is alarmingly high, with an increasing trend among Orang Asli, which needs immediate attention. The NCDs and obesity were significant among Malays but also showed a worrying trend in the Orang Asli as the good practice on a healthy life-style was low in both ethnicities. Thus, proper education and promotion regarding NCDs needed for diseases screening and prevention.

Keywords: Knowledge, Attitude, Practices, Non-Communicable Disease, Orang Asli, Malay.

INTRODUCTION

Non-communicable diseases (NCDs) or chronic diseases are the significant and growing public health problems affecting all countries, including Malaysia. Report by the World Health Organization (WHO) in 2018 showed that from fourth reported death in Malaysia, three of them were due to non-communicable diseases¹. Cardiovascular diseases, including heart attacks and stroke, account for most NCD deaths, followed by cancers, chronic respiratory diseases, and diabetes. Unhealthy lifestyle factors and health-related behaviours such as smoking, alcohol consumption, physical activity, and dietary habits can affect a person's health and often results in a higher risk of these chronic diseases. The four major types of NCDs also share this same lifestyle-related risk factors².

In the National Health and Morbidity Surveys (NHMS) 2015 report, the national prevalence showed an increasing trend for all NCD risk factors in Malaysia. Based on the report, there was a variation between states. Negeri Sembilan lies on

the western coast of Peninsular Malaysia with Selangor on the north, Pahang in the east, and Melaka and Johor to the south. Negeri Sembilan comprised of seven districts and is known to have a heterogeneous population in terms of ethnic groups and rural-urban distribution. Comparing among states, Negeri Sembilan had among the highest prevalence of diabetes, hypertension, and obesity, with a percentage of 10.5%, 16.1%, and 23.5%, respectively. Furthermore, the prevalence of NCDs slightly higher in the urban areas compared to rural, but the difference was not statistically significant³.

An increase in the risk factors of NCDs includes smoking, inactive life (sedentary or less physical activity), obesity, and poor dietary habits observed with socio-economic development and urbanization in rural Malaysia. This transition affected the morbidity and mortality trends not only in major ethnic but also in the minority ethnic of indigenous people that also known as Orang Asli ethnic. Previous investigations mainly reported infectious diseases among Orang Asli⁴. However,

due to the epidemiological transition marked in rural Malaysia, the trend of the disease is now shifted from communicable to non-communicable diseases with no exception among the Orang Asli, particularly those staying in the vicinity of townships, and the out-skirt of existing rural villages^{5,7}.

Since NCDs mainly attributed to the unhealthy lifestyle of the individual, prevention of the diseases can be started earlier by having adequate knowledge of the conditions and adopting healthy lifestyle practices. This is primarily crucial as the illnesses might be under diagnosed and lead to several complications of the significant organ, including the brain, eyes, and kidney^{8,9}. Even though numbers of studies¹⁰⁻¹² reported on KAP level of chronic diseases in the general population, little is known about the knowledge towards NCDs among Orang Asli. To the best of our knowledge, only one study conducted looking at the knowledge of diabetes among the Orang Asli by Ahmad et al. in 2013¹³, with none of the reported research looking at the KAP towards NCDs conducted among the Malays and Orang Asli populations who are living nearby. Knowing the level of knowledge, attitude and practices of the community who are at risk will allow effective education and prevention programs targeting the benefits of healthy lifestyle behaviour which have the most significant impact on NCD prevention.

Therefore, the current study aimed to investigate and compared the prevalence of major NCDs and NCDs risk among the Orang Asli and the Malay populations in rural Negeri Sembilan, Malaysia. Their knowledge, attitude and practices (KAP) towards NCDs also determined and compared.

METHODS

Study Design

A cross-sectional study was conducted from November 2017 to December 2018 among Malay and Orang Asli population in rural Negeri Sembilan on Peninsular Malaysia.

Ethical approval obtained from the Ethics Committee of Human Research Ethics Committee, Universiti Sains Islam Malaysia, and the Medical Research and Ethics Committee, Ministry of Health, Malaysia. The purpose and procedures of the study explained to the authorities of the Department of Orang Asli Development (JAKOA), Malaysia, and the Village Community Management Council (MPKK) for Malay villages and the head (Tok Batin) of each village for Orang Asli Village. Written informed consent obtained from all individual respondents included in the study. Procedures were carried out following the Declaration of Helsinki by the World Health Organization in 2001¹⁴.

Study Population

The minimum sample size required for this study calculated according to the formula provided by Lwanga & Lemeshow¹⁵.

$$n = Z^2_{1-\alpha/2} [P_1(1-P_1) + P_2(1-P_2)] / d^2$$

At a 5% level of significance and a 95% confidence level, the minimum number of respondents required for the study was estimated at 554 (277 participants from each population), using the prevalence of hypertension among adult Negeri Sembilan populations about 23.5% as previously reported by Institute of Public Health Malaysia in 2015¹.

Respondents recruited from the community of Malay and Orang Asli in the rural area. The two chosen districts in Negeri Sembilan state were Jelebu and Kuala Pilah. The main sub-tribe that existed here is the Temuan, which belongs to the Proto-Malay tribe group.

The selection of villages conducted using the systematic sampling method. By using this method, a systematic sample is obtained by selecting a random start at the beginning of the list of the villages provided by the authority. The used of this method allow the same precision as a simple random sample¹⁶. Orang Asli villages and nearby comparable Malay villages identified from both districts as a sampling location.

The Orang Asli villages were categories as rural as it is located near to Malay villages. They also have a good accessibility to such amenities, including piped water, electricity supply, and roads that connect their villages with other surrounding areas. Additional to that they also have a land development project and a sustainable economic source. The set of villages selected in this study were in common in term of infrastructure and economic set-up. The selection of each participant was performed using the purposive and snowballing sampling method based on the defined inclusion and exclusion criteria.

The inclusion criteria were individuals aged between 18 years old and above who provided informed consent. They shall be the ethnicity of Malay and Orang Asli. Anyone with mental or physical disabilities or those who pregnant excluded. Individuals who did not understand the Malay language also excluded since the survey was conducted in Malay.

Structured Questionnaire

A structured questionnaire was written in English and translated into the Malay language, which is the national language of Malaysia (Bahasa Malaysia). For Orang Asli populations, Bahasa Malaysia is the common second language and the primary language used by villagers to communicate with outsiders. In all locations, the

Orang Asli villagers have a good command of the national language. Cronbach's alpha test used to assess the internal consistency of the questionnaire. The questionnaire piloted among 30 respondents who had a similar profile of the target population. For the Malay community, Cronbach's alpha coefficient values for KAP domains was 0.700, 0.765 and 0.740, respectively. Whereas for Orang Asli, the Cronbach's alpha coefficient values for KAP domains was 0.961, 0.898 and 0.705, respectively. Thus, the Cronbach alpha coefficient values of more than 0.700, reflecting the good internal consistency and reliability of the questionnaire¹⁷.

The participants were interviewed by trained field assistants who recorded the information pertinent to the respondents. The first part on socio-demographic information of the respondents also sections on knowledge, attitude and practice regarding NCDs in the second part and finally, the anthropometric measure in the third part.

The first part of socio-demographic information of the respondents includes gender, age, and educational level. Their smoking status, alcohol drinking status, and physical activity also assessed. The individual considered physically inactive if they did not conduct any aerobic physical activity that requires energy expenditure for minimum of 150 minutes throughout the week¹⁸. For chronic disease status, presence or absence of chronic diseases based on self-reported information on chronic conditions diagnosed by a medical professional. Respondents were asked, followed by a list of chronic diseases, including hypertension, hypercholesterolemia, and diabetes mellitus, to which the answer is "yes" or "no"¹⁹.

The second part of knowledge, attitude, and practices contained questions regarding NCDs adapted from Ithnin et al. in 2018¹⁴. The answer choices were 'yes', 'no,' and 'not sure' for 27 knowledge questions. The part on attitude regarding NCDs and its prevention used Likert-scale type of items: 15 questions on attitude with five scales of 'strongly agree' to 'strongly disagree.' Six questions on practice with the choices of the response of 'frequent,' 'sometimes,' and 'never' for behavioural practice.

After completing the questionnaire, height measured to the nearest 0.1 cm and weight measured in the upright position to the nearest 0.1 kg using a portable Seca 769 Electronic Column Scales (Seca, Germany). Body mass index (BMI) was calculated by dividing weight (kg) by height squared (m²), based on the revised criteria specific for Asian/Pacific populations. The value of BMI \geq 25 kg/m² used to define obese²⁰. Waist circumference was measured at the end of normal expiration in a horizontal plane, midway between the inferior margin of the ribs and the superior

border of the iliac crest²¹. Waist circumference (WC) measurements recorded to the nearest 1 cm by using a non-stretchable measuring tape. For assessing central abdominal obesity, waist circumference cut off values of >90 cm for men and >80 cm for women used in this study²⁰.

Systolic and diastolic arterial blood pressure measured by using Omron Automated Blood Pressure Monitor HEM-7120 (Omron, Japan). Automated blood pressure can be used to obtain accurate readings as it also provides feasibility and safety²². The measured taken when the subject is calm and not sought after meals or after exercise. The reading taken during sitting on the left hand supported at heart level in sitting upright position. It was measured twice, with two minutes apart when the respondent is at rest. Then, the average measurements used as the BP value for individual respondent²³. Respondents who had a systolic blood pressure of 140 mmHg or more or diastolic blood pressure of 90 mmHg or more were categories in increased blood pressure groups⁵.

Blood glucose measured by Accu Chek Performa Glucose Meter System (Roche, USA). Respondents with fasting blood glucose (FBG) of 6.1 mmol/L or more (or non-fasting blood glucose of more than 11.1 mmol/L) were categorized as high blood glucose⁵.

Statistical analysis

Statistical analysis was carried out using the SPSS 23 statistical software package (SPSS Inc., Chicago, IL). Categorical comparison between Malay and Orang Asli conducted using the Chi-Square test and Fisher-Exact test for bivariate analysis.

Independent variables tested by simple logistic regression and included in multivariate analysis to determine the association between ethnicity and major NCDs and its risk factor. Before performing a linear regression analysis, the assumption of multicollinearity between variables was tested based on the variance inflation factor <10 . No evidence of multicollinearity found. All variables with a value of $p < 0.25$ in the univariate regression analysis included in the multiple logistic regression analysis. The $p < 0.25$ test used based on evidence that the threshold ($p < 0.05$) could exclude relevant variables²⁴. Then, the preliminary final model obtained Hosmer-Lemeshow goodness-of-fit test and classification table used to determine the fitness of the model. The results presented with crude and adjusted Odds Ratio (OR), 95% Confidence Interval (CI) and P-value. P-value of less than 0.05 considered statistically significant.

For the knowledge, attitude, and practices part, the correct answers converted to 100%, and marks below 50% were considered poor, 50%-74% was

deemed to be moderate, and marks 75% and above were deemed to be good. Histogram with normality curve and Kolmogorov-Smirnov test were used for the normality and homogeneity of variance for knowledge, attitude and practice score. Since the data not normally distributed, the non-parametric Mann-Whitney test was used to determine the predictor of ethnicity variables for NCDs KAP level. P-values of less than 0.05 considered statistically significant for all the tests.

RESULTS

Six hundred thirty-four participants fulfilled the inclusion and exclusion criteria, which comprised of 325 (51.3%) Orang Asli and 309 (48.7%) Malay from rural villages. The demographic characteristics of the participants summarised in Table 1. The mean age for Orang Asli was 39.92 years \pm 13.196 and 54.61 years \pm 16.112 for Malay. The Orang Asli has significantly lower education level compared to Malay, about 32.9% of the Orang Asli had no formal education, and only 4.0% of them had received tertiary education.

Table 2 shows the prevalence of hypertension, hypercholesterolemia, and diabetes mellitus among the rural community was 24.6%, 17.8%, and 10.1%, respectively. The percentages of Malay with diagnosed NCDs were higher than the Orang Asli with hypertension (35.0% vs. 14.8%), hypercholesterolemia (31.1% vs. 5.2%) and diabetes mellitus (4.2% vs. 4.3%), respectively. The Malay respondents also had a higher percentage of being abdominal obese (70.6% vs. 59.7%), increased blood pressure (54.4% vs. 29.8%), and elevated blood glucose (8.7% vs. 5.5%) compared to the Orang Asli. For lifestyle NCDs risk behaviour, smoking cigarette status was 31.7% for Malay and 28.0% for the Orang Asli. More than half of the respondents were physically inactive (52.1%), with 53.7% and 50.5% among Malays and the Orang Asli, respectively. For Orang Asli, 7.1% of them consume the alcoholic drink.

Bivariate testing indicates the relation between ethnicity and determinant factors. The results show that there are six variables with significant correlation, namely, hypertension ($P < 0.001$), hypercholesterolemia ($P < 0.001$), diabetes mellitus ($P < 0.001$), abdominal obesity ($P < 0.004$), increased blood pressure ($P < 0.001$) and alcohol consumption ($P < 0.001$).

Multivariate test results (Table 3) show three variables have a significant influence in Malay ethnicity, namely, hypercholesterolemia with OR=6.035 (95%CI: 3.150,11.561), abdominal obesity with aOR= 1.807 (95%CI: 1.065, 3.067), and increased in blood pressure with OR 2.359= (95%CI: 1.619,3.437).

Figure 2 shows the KAP categorization among the Malays and Orang Asli, while Table 4 shows the KAP score association between ethnicity. For the knowledge category, the majority (67.3%) of Malays in the good category. In Orang Asli, more than half of them (51.7%) them in the poor category, with only 25.8% of them in the good category. The total mean and standard deviation of knowledge score was 22.28 \pm 6.072, with a median of 27 and interquartile range (IQR) of 7 for the Malays. Whereas, for the Orang Asli, their knowledge score was significantly less than Malay with mean 12.82 \pm 9.671, median 13, and IQR of 19 ($p < 0.001$).

For Malay, the total mean attitude score was 65.52 \pm 5.747, with a median of 68 and IQR of 7, which is significantly higher than the Orang Asli with mean attitude score was 59.81 \pm 6.237 and a median of 60 and IQR of 8 ($P < 0.001$). However, even though the Orang Asli attitude score lowered than Malays, most of them were in a good attitude category.

For Malays and Orang Asli, only 22.3% and 16.0% had a good practice, respectively. The total mean practice score was 7.84 \pm 2.137, with a median of 8 and IQR 3 for Malays and 7.84 \pm 2.137, median 8, IQR 2 for Orang Asli with no significant difference among them.

Table 1: Distribution of socio-demographic characteristics (n=634)

Characteristics	Total no. (%)	Malay (n = 309) no. (%)	Orang Asli(n = 325) no. (%)	P-value
Socio-demographic				
Age category				
18-39	242 (38.2)	66 (21.4)	176 (54.2)	-
40 and above	392 (61.8)	243 (78.6)	149 (45.8)	
Gender				
Male	225 (35.5)	131 (42.4)	94 (28.9)	-
Female	409 (64.5)	178 (57.6)	231 (71.1)	
Education				<0.001 ^{ab}
None	123 (19.4)	16 (5.2)	107 (32.9)	
Primary	226 (35.6)	101 (32.7)	125 (38.5)	
Secondary	233 (36.8)	153 (49.5)	80 (24.6)	
Tertiary	50 (7.9)	37 (12.0)	13 (4.0)	
Others	2 (0.3)	2 (0.6)	0	

^a Fisher-Exact Test; ^b Significant at $p < 0.05$ levels

Table 2: Bivariate analysis of disease profile and NCDs risk in Malay (n= 309) and Orang Asli (n=325) communities

Characteristics	Total, no.(%)	Malay, no.(%)	Orang Asli, no. (%)	P-value
Self-reported NCDs				
Hypertension	156 (24.6)	108 (35.0)	48 (14.8)	<0.001 ^{ab}
Hypercholesterolemia	113 (17.8)	96 (31.1)	17 (5.2)	<0.001 ^{ab}
Diabetes Mellitus Type II	64 (10.1)	50 (16.2)	14 (4.3)	<0.001 ^{ab}
NCDs risk				
BMI Obese (≥ 25.00 kg/m ²)	379 (59.3)	184 (59.5)	192 (59.1)	0.904 ^a
Abdominal obesity	412 (65.0)	218 (70.6)	194 (59.7)	0.004 ^{ab}
Increased blood pressure	265 (41.8)	168 (54.4)	97 (29.8)	<0.001 ^{ab}
Increased blood glucose	45 (7.1)	27 (8.7)	18 (5.5)	0.117 ^a
Alcohol consumption	23 (3.6)	0	23 (7.1)	<0.001 ^{ab}
Cigarette Smoker	189 (29.8)	98 (31.7)	91 (28.0)	0.307 ^a
Physically inactive	330 (52.1)	166 (53.7)	164 (50.5)	0.411 ^a

BMI: body mass index; ^a Chi-Square Test; ^b Fisher-Exact Test; * Significant at p<0.05 levels

Table 3: Univariate and multivariate analysis of major NCDs and NCDs risk in Malay and Orang Asli communities (n=634)

Variables	Crude OR ^a (95% CI)	P-value ^b	Adjusted OR ^b (95%CI)	P-value ^b
Hypertension	3.101 (2.109,4.559)	<0.001*	1.038 (0.624,1.727)	0.860
Hypercholesterolemia	8.166 (4.737,14.076)	<0.001*	6.035 (3.150,11.561)	<0.001*
Diabetes Mellitus Type II	4.288(2.318,7.93)	<0.001*	1.760(0.776,3.991)	0.176
BMI Obese (≥ 25.00 kg/m ²)	1.020 (0.743,1.400)	0.904	-	-
Abdominal obese	1.618 (1.163, 2.250)	0.004*	1.807 (1.065, 3.067)	0.025*
Increased blood pressure	2.801 (2.021, 3.88)	<0.001*	2.359 (1.619,3.437)	<0.001*
Increased blood glucose	0.612 (0.330, 1.136)	0.120	0.681 (0.315,1.469)	0.327
Cigarette Smoker	1.194 (0.850,1.679)	0.307	-	-
Physically inactive	1.140 (0.834,1.557)	0.412	-	-

^aSimple logistic regression; ^bMultiple logistic regression; Minimum tolerance value=0.587; Maximum VIF value=1.702; Hosmer-Lemeshow test P-value= 0.508; Overall percentage correct=67.4%; Dependent variables: Major NCDs

Table 4: Association between ethnicity with total scores of knowledge, attitude, and practice regarding NCDs using Mann-Whitney Test (n=634)

Characteristics	Malay (n = 309)		Orang Asli (n = 325)		P-value
	mean (SD)	median (IQR)	mean (SD)	median (IQR)	
Knowledge	22.28 (6.072)	27 (7)	12.82 (9.671)	13 (19)	<0.001*
Attitude	65.52 (5.747)	68 (7)	59.81 (6.237)	60 (8)	<0.001*
Practices	7.84 (2.137)	8 (3)	7.66 (1.780)	8 (2)	0.800

SD: Standard deviation; IQR: Interquartile range; * Significant at p<0.05 levels

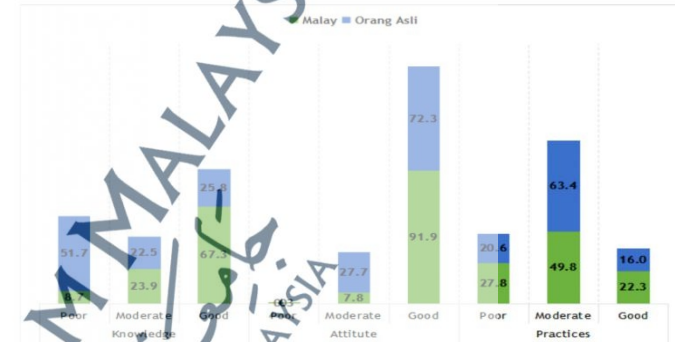


Figure 4: Level of knowledge, attitude and practices among respondents by percentages

DISCUSSION

The study found that the overall prevalence of NCDs among the rural population for hypertension, hypercholesterolemia, and diabetes mellitus was 24.6%, 17.8%, and 10.1%, respectively. The rate was higher compared to the national report by Institute for Public Health for Malaysian rural populations, which were 12.8%, 7.1% and 7.2% for hypertension, hypercholesterolemia, and diabetes mellitus, respectively. The rates of NCDs may vary in different populations based on their demographic profiles, lifestyles, and on the diet and food intake. Negeri Sembilan is among the highest state reported with this NCDs condition, with most of the participants in this study aged above 40 years old, thus contributed to the reported rate in this study slightly higher compared to general Malaysian populations^{3,26,27}. For the transitional community living in the rural, epidemiological transition towards modernization lead to a similar prevalence of NCDs trend comparable to the urban population²⁸.

An earlier study in Perak rural community also reported a similar finding, which showed the Malays had a higher prevalence of metabolic syndrome conditions and cardiovascular risk factors as compared to the Orang Asli^{6,7}. However, these studies also emphasize the increased prevalence of this NCDs risk as compared to very early reported studies among Orang Asli with low-risk factors and the absence of coronary heart disease⁹ and prevalence of diabetes mellitus was 0.3% back in 1993³⁰. The Orang Asli tribe in this study was from the Temuan subtribe. Comparing

to another study among Proto-Malays from the Jakun tribe reported a lower prevalence of diagnosed hypertension, hypercholesterolemia, and diabetes with a prevalence of 9.7%, 0, and 4.2%, respectively³¹.

During these early studies also found that none of the Orang Asli was obese. However, we found no significant difference in BMI obese in these communities, with more than half of the respondents, were having a BMI obese²⁹. Abdominal obesity among Malays was significantly higher, but the percentages were also high among Orang Asli as compared to the study reported by Ali et al. in 2016⁷. The rural community of Malays and Orang Asli with a high prevalence of BMI obese (59.3%) and abdominal obesity (65.0%), which indicates that either they had a sedentary lifestyle or an unbalanced diet^{31,32}. In this study, the participants with increased blood pressure and blood glucose were also worrying. Even though the percentage among the Orang Asli was lower compared to Malays, the percentages were also higher than reported by Wong et al. in 2018 in the Orang Asli³¹.

The social behaviour in terms of alcohol drinking habits, smoking, and physical activity may determine the distribution of disease in both communities. Harmful use of alcohol is known to cause cardiovascular diseases, diabetes, and cancers⁵. Since alcohol is prohibited among Muslim Malay, none of them were alcohol drinkers.

The four main types of NCDs contributed to modifiable behaviour risk factors of tobacco used⁹. No significant difference found for smoking in both communities. Even though the Orang Asli reported lower percentages of smokers compared to the Malays, previous studies reported that among those who smoked, the percentage of heavy smokers was higher among the Orang Asli compared to Malays³². Since this study did not explore the pattern of the cigarette or tobacco smoking, further studies to gather this data may be essential as behaviour is modifiable. Additional to that, a study on smoking behaviour among secondary school students in Negeri Sembilan also showed a worrying trend with rural adolescents (15.3%) had significantly higher percentages of current smokers compared to 12.8% of urban adolescents. The prevalence of smoking was also higher among Malay (20.4%) and Orang Asli (17.0%) adolescents³³. This problem should be curbed early as this behaviour will last until their adulthood if no preventive and health promotion strategic that lead to additional public health burden to the government.

The physical activity is known as a protective factor from the development of cardiovascular diseases and diabetes³⁴. However, about half of the respondents were physically inactive with no significant difference in both communities. Environmental plays an essential role in the involvement of physical activity. Even for the rural indigenous community locally and worldwide, lack of physical activity was observed due to poor maintenance of natural resources and limited access to space and facilities that support an active lifestyle in their settlement, which has implications for NCDs risk later in life^{35,36}.

In this study also, only 24.6% of the Orang Asli completed secondary school, which was less than half the national average of 72.0%³⁷. The low educational attainment among the Orang Asli posed a severe limitation for acquiring knowledge on health-related disease, including NCDs. Finding from this study shows poor knowledge on the NCDs in the Orang Asli compared to rural Malays. This knowledge disparities among the Orang Asli in Malaysia have been previously reported even in the more urbanized Orang Asli³⁸⁻⁴⁰. With a low attitude towards disease, it might pose an additional challenge for the government in disease management in this vulnerable population as chronic diseases may develop slowly without early signs and symptoms of illness until later stages. For NCDs management within the primary health care system provided by Malaysian government is on integrated and comprehensive service delivery at the first point of contact to provide a full range of NCDs services, including: promotive, preventive or wellness services; screening; identification of risk factors; intervention; treatment; and rehabilitation⁴¹.

Finding from this study shows low lifestyle practices behaviour with no significant difference in both communities. Therefore, preventive strategies that aimed at reducing exposure to the risk of diseases including early risk identification through screening, risk intervention via increasing education and health promotion, and risk management of continuous disease monitoring shall be strategic in both communities, particularly among the Orang Asli.

For the Orang Asli, numbers of research consistently show the link between their lifestyle changes and obesity, metabolic syndrome, and ultimately NCDs^{7,31,40}. Due to the vulnerability of this community and the heterogeneity across tribe, the differences in disease burden and risk factors that affect groups of Indigenous people shall be explored further as it is known that large numbers of people's in this community with low income, lagging in education and poor living conditions⁴². The use of mix methods as the basis for exploring this issue using the quantitative and qualitative approach suggested in the future. In community practices, the input gathers from this approach will provide more meaningful data for a targeted intervention program that suits to the community can be designed^{31,43}.

This cross-sectional study could not determine the cause-effect relationship, and the findings from this study could not be generalized to the rest of the rural communities, particularly among Orang Asli populations in Malaysia due to their heterogeneous across tribe⁴². The degree of generalizability also remains a potential issue associated as a convenience method used for sampling methods. However, this method was commonly used mainly in the study among the Orang Asli populations^{13,44}. There was a likelihood of data misreporting due to the respondents either under- or over-reporting for their prevalence of the diseases. Nevertheless, to the best of our knowledge, this was the first study that attempted to assess the knowledge, attitude, and knowledge of lifestyle behaviour risk NCDs as previous studies more focus on a specific type of NCDs in rural Malaysian and also among the Orang Asli in Malaysia. This study also determined the burden of major NCDs and their NCDs risk factors among transitional communities that living with one another.

CONCLUSION

Life-style related NCDs is at an alarming level in a rural community with an increasing burden among the Orang Asli communities. With low knowledge and attitude on the diseases and comparable in terms of life-style behavioural practices level among the Orang Asli, immediate actions by researcher, health professional and also government agencies is essential to educate the people at risk so further early screening and prevention of health risks can be strategic since

this life-style related NCDs is modifiable and preventable.

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Conflict of Interest

There is no conflict of interest with regard to the study.

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Behavioural Risk Factors of Non-communicable Diseases (NCDs) Determinant in the Context of an Orang Asli (Indigenous peoples): A Qualitative Study

Muslimah Ithnin^a, Norsham Juliana^b, Nadeeya 'Ayn Umaisara Mohamad Nor^c, Nadia Mohd Effendy^d and Mohd Dzulkhairi Mohd Rani^e

^aFaculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Nilai, Malaysia.

^bDepartment of Medical Science I, Faculty of Medicine and Health Sciences, Nilai, Malaysia.

^cDepartment of Primary Care, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Nilai, Malaysia.

^dDepartment of Medical Science II, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Nilai, Malaysia.

Abstract

The emergence of non-communicable diseases (NCDs) among the minority Indigenous peoples of Peninsular Malaysia, known as the Orang Asli community, is concerning. The high prevalence of NCDs is related to the lifestyle transition occurring in this community. The present qualitative study explores the determinants factors of behavioural risk factors of NCDs among Orang Asli living in the fringe settlement category of Jelebu, Negeri Sembilan. Participants from an Orang Asli village were selected purposefully to take part in a semi-structured interview. The narratives data from 16 interviews were recorded, typed, and analysed according to four behavioural risk factors for NCDs include unhealthy diet, physical inactivity, tobacco use and harmful alcohol use that contribute to major NCDs. The interview continued until data saturation. Thematic analysis of the interview data revealed that good knowledge of individuals committed to a positive influence on healthy behaviour. Low awareness of the individual, environmental constraint, socioeconomic challenge and social characteristics are the negative determinants to behavioural risks of NCDs in Orang Asli. To successfully reduce the risks factor of NCDs among the vulnerable Orang Asli, it is essential to increase the awareness on a healthy lifestyle by looking into the individual elements, cultural-environmental backgrounds, and economic challenges.

Keywords: in-depth, Malaysia, non-communicable diseases, Orang Asli, qualitative

1. INTRODUCTION

Non-communicable diseases (NCDs) are responsible for nearly 70 percent of deaths worldwide, and approximately 75 percent of all NCD-related deaths occur in low- and middle-income countries (WHO, 2013). In Malaysia, about 73 percent of deaths were caused by NCDs (IPH, 2015). With that, males and females, respectively, have 21 percent and 14 percent of premature death (WHO, 2018). In 2017, the World Health Organization (WHO) called for the reduction of premature deaths due to four NCDs, namely diabetes, cardiovascular diseases, cancers and chronic respiratory diseases. The primary strategy proposed to achieve the set goal is to reduce the common behavioural risk factors of non-communicable diseases which are highly prevalent.

The four behavioural risk factors for NCDs include unhealthy diet, physical inactivity, tobacco use and harmful alcohol use. The 2015 Global Burden of Diseases, Injuries, and Risk Factors Study examined linkages between risk factors and poor health literacy. Diet low in fruit and vegetables, contributed most to disability-adjusted life-year (DALY) rates, associated with three groups of disease: cardiovascular and circulatory diseases,

cancers, and diabetes and urogenital, blood, and endocrine diseases. Decreased physical activity ultimately worsening levels of metabolic risks, with associated higher rates of cardiovascular diseases and cancers. Smoking was the second leading risk factor for men in 2015, contributing to 9.6% of DALYs and a large proportion of male disease burden from cardiovascular and circulatory diseases, cancers, and chronic respiratory conditions. And for alcohol use was associated with 6.6% of disease burden primarily due to cirrhosis and other chronic liver diseases (Ferozianfar et al., 2016).

With the recognised unforeseen impact of these risk factors on the health of the individual, it is necessary to monitor the extent of these risk factors in the community and to plan strategies to reduce these risks to the same extent. Indigenous peoples, with no exception, are also part of the unfortunate health crisis. The indigenous peoples of Peninsular Malaysia, also known as Orang Asli (OA), are a minority population, accounting for about 0.6 percent of the total population of Malaysia (JAKOA, 2016). As this country's transition to urbanisation continues, NCDs and their risk factors will continue to increase in indigenous communities, including Orang Asli. Previous studies reported a high prevalence of NCDs particularly among the Orang Asli community living in urban and fringe categories (Phipps et al., 2015; Ashari et al., 2016; Aghakhanian et al., 2018).

In the studies on behavioural NCDs risk factors among Orang Asli, their practices on behavioural NCDs risk were as high as the major ethnic in Malaysia (Poh et al., 2010; Ahmad et al., 2018). A study was conducted among the Orang Asli living in fringe category settlement by Ithnin et al. in 2020. In this study, 325 of Orang Asli participate in quantitative research to determine the level of behavioural NCDs practices. Findings from this study reported only 16.0% of the participants had good practices towards behavioural NCDs risks factor. There is also a worrying high number of participants with moderate and low knowledge towards NCDs with 22.5% and 51.7% respectively.

Although quantitative studies give us useful and vital information about the prevalence of behavioural NCDs risk factors among NCDs, they are not based on the experience and deep understanding of individuals, as the factors influencing and affecting the behaviour among them. Behavioural risk factors appear as the four significant modifiable risk factors with the potential to reduce the current health inequalities (Ebenezer & Marlow Waller, 2019). In addition to intensive strategies that target high-risk individuals, supporting healthy lifestyles among vulnerable populations is also an important aspect of delaying or ideally, preventing the occurrence of this chronic diseases. Nevertheless, a lack of cultural understanding has emerged as a potential barrier limiting Orang Asli communities from engaging in health intervention and strategies (Chandren et al., 2015).

Thus, this was an explanatory qualitative study from the previous quantitative research conducted in Jelebu, Negeri Sembilan by Ithnin et al., in 2020. It was hoped that this study would decolonise the narrative and support a more secure, qualitative forms of evidence, on the determinant factors associated with the high behavioural NCDs risks among the Orang Asli.

2. METHODS

2.1 Study design

A local explanatory study with a conventional thematic analysis approach was conducted to identify the NCDs behavioural risk factors of major NCDs accurately. In the present study, the researchers used individual interviews because, according to quantitative interviews, the majority of the Orang Asli preferred to provide information in a private environment. Therefore, data were collected through face-to-face interviews.

2.2 Recruitment and participants

One Orang Asli settlement was chosen as the qualitative study area from the 13 OA settlement at Jelebu, Negeri Sembilan. The village was purposely selected as it met the requirements that allowed the researcher to explore the possible effect of urbanisation and to understand the critical issues associated with NCDs. This research was carried out in an Orang Asli community settlement situated in Kampung Orang Asli Ulu Kelaka, Jelebu district, Negeri Sembilan. This village is categorised as a fringe category. The settlement which are within 5 kilometres from the main roads and has characteristics such as being neighbours to Malay villages and experienced marked social changes.

^{*}Corresponding author. Tel: +606-798 8000; Fax: +606-798 8204
E-mail: drdzulkhairi@usim.edu.my

The participants were recruited in April 2019. The interview took place at the community hall of the Kampung Orang Asli Ulu Kelaka. It was essential to interview the participants in a place where they felt comfortable (Gill et al., 2008). Inclusion criteria required that participants were Orang Asli ethnicity, aged above 18 years and had stayed in the settlement for at least one year. Only participants staying longer than one year were included as they would be familiar with the environment of the settlement.

2.3 Data collection

Semi-structured interviews were undertaken, and participants were continually recruited until the researchers perceived that the dialogue had reached a data saturation point. The interview process consisted of three main sessions, namely, introduction, actual interview, and closing. In the introduction session, the participant was informed about the study details, and they were given assurance about the ethical principles applied in the study, such as anonymity and confidentiality. The format and content of semi-structured interviews for actual interviews were presented in Table I. At the end of the interview, and the interviewer thanked the participants for their time. They also asked if the participants have anything they would like to add. The interviews took about 30 to 50 minutes.

Table I. Format and content of semi-structured interviews.

Area	Questions
Fruit and vegetable intake	What is the effect of a lack of consumption of vegetables and fruits on health? Explain the factors that influence the consumption of fruits and vegetables socially, economically and access to you?
Physical activity	Can you explain in more detail the effects on health if you are physically active and inactive? Tell me about your experience in this village, in terms of challenges or difficulties and support in carrying out physical activities?
Tobacco use	How can smoking habits cause harm to health? In your opinion, what are the factors that influence a person to start smoking? In your opinion, what are the factors that can motivate a person to quit smoking?
Alcohol consumption	What are the negative effects and risks of alcohol consumption on health? Based on your observations, what are the factors influencing a person's excessive alcohol consumption?

2.4 Data Analysis

The in-depth interview was audio-recorded with participant consent, transcribed verbatim, and translated into English. Translations were verified by a second person fluent in the language. Transcripts were analysed using thematic content analysis. As coding proceeded, additional themes emerged. To assist in transferring and coding, the completed interviews were transcribed verbatim in Microsoft Office Word 2016 (Microsoft Corporation, United States) by the researcher.

After that, the researcher explored the data by reading through the interview transcripts and the researcher's notes. Qualitative data were analysed using a content-based thematic approach guided by the Graneheim & Lundman (2004) frameworks. The researcher explores the data by reading through the interview transcripts and the researcher's notes. Study themes and sub-themes were established after numerous readings of interviews and discussion transcripts. Qualitative information was then grouped into patterns and themes that addressed the objectives of the study (Purvesvary et al., 2008). The data analysis was then presented in a narrative form using the quotations obtained from the interview transcription.

2.5 Ethical Consideration

This study is part of a PhD thesis in NCDs risks and health behaviour among the Orang Asli, which has been approved by the Malaysia MOH, Ethical committee from the Medical Research and Ethics Committee (MREC) (KKM/NHSEC/P18-2338(1)), Department of Orang Asli Development (JAKOA), the Malaysian government agency entrusted to oversee the affairs of the Orang Asli also granted permission to conduct the study.

3. RESULTS

A total of 16 adults aged 18 years and older from the Proto-Malay group of Orang Asli were participating in the in-depth interview session. No repeated interviews were performed as the research team found that the areas of enquiry had been adequately addressed in each case. The four categories of behavioural risk of NCDs explored in this study were fruit and vegetable intake, physical inactivity, smoking and alcohol consumption. The theme and determinant of knowledge and factor for each of the NCDs behaviour were presented in Table II. The themes were interrelated, with themes good knowledge on behavioural risks for positive influence in disease prevention. In contrast, themes factors were considered to be negatively influencing factors on the potential increased on the unhealthy behaviour prevalence.

Table II. The determinant for behavioural NCDs risk factors in Orang Asli

Behavioural risks	Positive factors	Negative factors
A. Fruit and vegetables intake	i. Knowledge on nutrition	i. Knowledge deficit ii. Reduction in crop production iii. Transportation limitation iv. Financial constraint
B. Physical activities	ii. Knowledge on essential of physical activity	i. Low awareness ii. Lack of community facility iii. Time constraint
C. Smoking	i. Knowledge of adverse effect	i. Social influence ii. Individual desire iii. Addiction
D. Alcohol consumption	i. Knowledge on negative effect on health ii. Social problem	i. No awareness ii. Environmental influence iii. Stress management strategy iv. Addiction v. Money to spend

3.1 Inadequate fruit and vegetable intake

3.1.1 Facilitator: Knowledge on nutrition

Several participants talked about the importance of nutrition to health, with some mentioning the importance of a healthy diet and also reducing sweet and fat intakes. They also realized that a healthy diet contributes to a lower risk of obesity.

"For us to maintain good health, we need to take care of our food. Watch out for our diet. Reduce oily and fatty foods. We also need to reduce high cholesterol foods and sweet beverages. I do practically all of that. If we do not take care of our diet, then it will affect our health."

[Interviewee No. 15]

"We need to take care of our nutrition. If we overeat, then we can become overweight."

[Interviewee No. 12]

3.1.2 Barrier i. Knowledge deficit

However, there is a participant who did not know the relevance of nutrition to health.

"I do not know the factors that can give me good health. I do not know much about nutrition."

[Interviewee No. 1]

3.1.3 Barrier ii. Reduction in crop production

One of the barriers to the intake of vegetables was the reduction of crop production due to environmental factors such as animal disturbance and weather. And the fruit intake was also influenced by the seasonal factor. The

fruits available in the village have been limited. They could only eat fruit during the fruit season when a lot of local fruits, such as rambutan and durian, were available.

"If I need money, I will go and sell banana leaves. We planted tapioca on our farm before, but a pig came and destroyed all the plants."

[Interviewee No. 5]

"My food intake is still the same compared to before. I only eat tapioca leaves. But it is difficult to get traditional food like tapioca shoots because the weather is hot nowadays."

[Interviewee No.7]

"For fruits, we need to buy it. If it is not a fruit season, then there will be no fruits available in this village."

[Interviewee No. 12]

3.1.4 Barrier iii. Availability of transportation

Since some of them had to buy the vegetables or fruits from outside the village, they relied on transportation availability.

"There is a change in vegetable intake compared to previous years. Sometimes we get the vegetables from the plants in our farm. Tapioca shoots. Now it is harder because we need to buy it. I don't have transport or money. Sometimes I go out to buy only once a month."

[Interviewee No. 6]

"Last time when we want to eat vegetables, we can crop the vegetables like the tapioca or sweet potatoes from the farm. Now we don't do that. Now vegetables are bought from outside. Same with fish and chicken. We need to buy them. I need to wait for my husband to take me to buy vegetables or fruits outside the village."

[Interviewee No. 8]

3.1.5 Barrier iv. Financial constraint

Many of them also added they faced a restricted supply of vegetables and fruits for consumption due to financial constraints.

"I do buy fruit and vegetables. Sometimes there is no money to buy food, and sometimes we had only ten or twenty Ringgit to purchase food..... We need to ride the motorcycle to purchase food."

[Interviewee No. 10]

"To buy vegetables, we need to have money, it's difficult since I don't have money. It's also difficult to buy since the shop is quite far from the village. I only have a motorcycle as my mode of transportation."

[Interviewee No.7]

3.2 Physical inactivity

3.2.1 Facilitator. Essential of physical activity

There have been many comments on the effects of physical activity on health. Many agreed that active lifestyles are essential to health.

"We need to be physically active. Because if we are inactive, we will feel weak. We can also get painful joints. That is because we never did that activity. Because we are busy working. Working and workouts, there is a difference. It is also essential for us to get sweaty. At the same time, we can reduce our weight, so we do not become obese."

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[Interviewee No. 3]

"To maintain our health, we need to exercise. Every morning, we should go for rubber tapping and walking. We need to be active. If we lack movement, it can cause health deterioration."

[Interviewee No.11]

3.2.2 Barrier i. Low knowledge on the importance of physical activities

However, in contrast to good knowledge of the essentials of physical activity, some participants had little awareness of the importance of physical activity in maintaining good health.

"I am not very sure about the importance of physical activity and how it can affect our health."

[Interviewee No.1]

"I wouldn't know the effects on health if we are physically active or inactive."

[Interviewee No.9]

3.2.3 Barrier ii. Lack of community facilities for physical activities

There was a limited number of facilities available for physical activity in the village. Many of them relied on domestic work and agricultural activity as part of their physical activities.

"There is a place to conduct physical activities, a small field. If adults like me wanted to do physical activities, then we take a short walk to walk to the orchard."

[Interviewee No.1]

"There is no place to do activities such as jogging. We only do gardening. If not, we wash laundry and do house chores as an exercise."

[Interviewee No. 13]

Participants also mention their interest in conducting physical activities. If there is an available facility to conduct physical activities, then it would be beneficial for the villagers.

"I think if it is available, then it will be great. Because we never did it. We also want to do exercises like stretching and other health activities. I think gardening is not enough and we need to do other physical activities."

[Interviewee No.3]

3.2.4 Barrier iii. Time constraint

Another deterrent to adult physical activity was that they didn't have enough time to exercise because they had to look after their kids.

"It is not very easy to carry out physical activities as I have children, so I don't have much time. Last time I used to be quite active. It was easier back then to do anything I want. Nowadays, when I do a bit of work, I will quickly get tired."

[Interviewee No.6]

"I never go for a jog. I only do walk. It is also challenging to go for a walk as I have a child at home."

[Interviewee No. 9]

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3.3 Smoking behaviour

3.3.1 Facilitator. Negative impact of smoking behaviour

Many comments were made about smoking behaviour and their health effects. In overall, all of the participants had a good knowledge of smoking behaviour, and they agreed that this behaviour is unhealthy as it can affect health. There is also a participant who had additional awareness about the Quit Smoking Clinic provided by the government.

"It is also important to avoid unhealthy lifestyles such as smoking and drinking alcohol. If we prevent this smoking behaviour, then we can get a good health."

[Interviewee No. 2]

"Smoking is not good for health."

[Interviewee No. 3]

"I know there is a Quit Smoking Clinic available. I used to advise my husband to go to the Quit Smoking Clinic. But he doesn't want to go. For me, it depends on the individual if they really want to quit smoking."

[Interviewee No. 13]

3.3.2 Barrier i. Social influence

Several factors have influenced a person's decision to start smoking. According to the respondents, the factors included social characteristics, namely having friends who smoke and influence them to start smoking.

"Friends influence smoking habit. They can avoid it if they want to. Someone can quit smoking if they want to. If they are interested in stop smoking, they can do it."

[Interviewee No.2]

"I have forbidden my kids from smoking. I have also pinched my children who smoked. However, their friends influenced them. So, until now, they are still smoking."

[Interviewee No. 3]

3.3.3 Barrier ii. Individual desire

Besides that, another aspect associated with the probability of smoking was the individual traits with which they had the personal desire and actually wanted to try out specific behaviours.

"I do not know why people want to smoke. I think they might think that smoking seems like fun, therefore they want to try it out. At first, they might just want to try it out but soon it became a habit. Once that person has started smoking, it is difficult to quit smoking. Impossible."

[Interviewee No.12]

3.3.4 Barrier iii. Addiction

While many knew about the adverse effects of smoking habits on health, other factors made quitting smoking difficult for them, including addiction to smoking behaviour.

"I did advise my family members to stop smoking but they did not listen. Once they started to smoke, they became addicted. Like what people say, smoking is like taking drugs. Once you take it, you will get addicted to it."

[Interviewee No.10]

"I have no idea with some of them (who smoke). But for my husband, he said he would be feeling dizzy if he stops smoking. I don't know what to say, so I just let him be."

[Interviewee No. 13]

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3.4 Alcohol consumption

3.4.1 Facilitator i. Negative effect on health

Similar to smoking, alcohol consumption is also a risk factor for the disease. Many agreed that the harmful use of alcohol could have a negative effect on health.

"It is also important to avoid unhealthy lifestyles such as smoking and drinking alcohol. For alcohol drinks, if we take it, we will get drunk. If we take the drink for a longer time, then our kidneys and livers will be damaged."

[Interviewee No. 2]

"Drinking alcohol can cause damage to the internal organs."

[Interviewee No. 15]

3.4.2 Facilitator ii. Social problems

In addition to the harmful health effect, the villagers also felt disturbed by alcohol consumption, because this behaviour caused a lot of social problems.

"Alcohol drinking not only causes you to get drunk. It also can cause people to like to fight. Even if we said the right thing, they would say that it is not the right thing."

[Interviewee No. 13]

"I have seen the youngsters in this village drink alcohol. For me, looking at the youngsters drinking alcohol makes me feel angry. When I see them get drunk, I feel angry as they have messed up. Sometimes they also get into a fight. But I won't help them. Leave them be. Looking for trouble when there is none, to begin with."

[Interviewee No. 14]

3.4.3 Barrier i. No awareness on the consequences of alcoholism

Even though the numbers of participants agree about the harmful effect of alcohol consumption, there is some of the participants did not know the negative impact of alcohol consumption on health.

"There is indeed someone that I know who drinks alcohol. I don't understand why they drink alcohol. I am also not sure of the negative effects of excessive alcohol intake to the body."

[Interviewee No. 6]

"I'm not sure why do people take alcoholic drinks. For me, there is no negative impact of drinking alcohol to health."

[Interviewee No.16]

3.4.4 Barrier ii. Environmental influence

There was mixed opinion on the factors that influenced alcohol consumption among the participants, for example, environmental influence from their friends.

"It was the influence of friends. If we tell them the negative effects of alcohol drinking, they will get angry at me."

[Interviewee No.1]

"My husband used to drink alcohol; his friends influenced him."

[Interviewee No. 4]

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3.4.5 Barrier iii. Stress management strategy

Participants also commented that some Orang Asli use alcohol as a stress management strategy.

"Previously, my husband also takes alcohol because he was stressed out due to family and financial problems. In this village, some people are selling these drinks to the villagers. But he stopped taking alcoholic drinks already."

[Interviewee No. 4]

"I have seen the villagers drink alcohol. It seems that they have a problem at working place or at home, that's why they take alcohol."

[Interviewee No. 15]

3.4.6 Barrier iv. Alcohol addiction

The participant also reflected on the alcohol intake as being an individual's personal preference. As some of them disagreed, stress led to alcohol addiction.

"From my point of view, they drink alcohol, not because of stress or anything. They want to take the drink. Because if they did it due to stress, then drinking alcohol would not reduce the stress level. As first, they just wanted to try, then they became addicted to the drink."

[Interviewee No. 3]

3.4.7 Barrier v. Money to spend

As for some of the participants, they commented that some members of their families and villagers would use it to purchase alcoholic beverages when they had extra money to spend.

"I don't know the reason they take this alcoholic drink. Sometimes if they get money, they will use the money to buy alcoholic drinks. If they don't have money, then they would not buy it."

[Interviewee No. 14]

"My husband also occasionally takes the drink. He drinks because he has money. But not as frequent as the rest. Not until addicted."

[Interviewee No. 15]

4. DISCUSSION

The future burden of NCDs depends on numerous factors including the behavioural risk factors (e.g., fibers intake, physical inactivity, smoking and alcohol use) of individuals. Previous study reported behavioural risk factors are an important factor that contributed to morbidity and premature death due to complications of NCDs (Devaux et al., 2020). Using qualitative analysis, this study sought to contextualise NCDs behavioural risks for Orang Asli as a precursor to investigating a potential way forward to address its disparate prevalence in that population. Similar to Malaysian general populations, Orang Asli is also at risk of developing major NCDs particularly those living in fringe (Ahmad et al., 2018, Wong et al., 2018). What was distinctive about the findings of this study were insights into the importance of the relational aspects and the link between facilitating the knowledge factor for disease prevention behaviour and the barriers to healthy behaviour, including low awareness of the individual, environmental constraints, socio-economic challenges and social characteristics.

Comments by some Orang Asli in the qualitative study led to a more in-depth study of knowledge, factors of influence and barriers to behavioural risks among NCDs. Although they were aware of the four modifiable risk behaviours that cause health deterioration, their knowledge was very general and not specific to any disease. Understanding their barrier to adapt healthy lifestyle behaviour will allow for a strategic intervention that responds to the needs of the OA without diminishing its social and cultural values (Rahman, 2018).

Most participants agree that balanced and healthy eating behaviour is vital for health, with only one female

respondent being uncertain about nutrition. The previous research on diet and nutrition among Orang Asli is very relatively scarce. Only one quantitative study by Chong, Appannah & Sulaiman in 2019 found reported low nutritional knowledge among Orang Asli women living in the Kuala Langat district of Selangor. The Orang Asli communities are assumed to have a lower barrier in terms of fibre intake. However, this study found that, although the majority of Orang Asli in the village relied on the agricultural activity as a source of income, the availability and choices of vegetables were limited. The traditional daily vegetables consumed by Orang Asli include fern shoots, sweet potatoes, and tapioca and *ulam*, such as *petai* and *jering* have been locally grown or harvested in the forest. However, there is a limitation of crop production due to weather conditions and wild animal invasion of their farm. When these crop supplies were limited, they needed to get their vegetables from an outside source. But for some of them, it is an added burden due to financial constraints and transportation issues.

The Malaysian Dietary Guidelines recommended the consumption of at least two servings of fruit per day (IPH, 2015). This research has not quantified fruit consumption. But the fruit consumption among the Orang Asli was minimal from the interviews. Most of the fruits available in their villages were seasonal, and thus their daily intake was reduced. The previous study by Haemamalar, Zalilah & Neng Azhanie (2010) also reported that seasonal factor and too high fruit prices for both local and imported fruit on the market are contributing factors for low fibre diet among Orang Asli.

There is a shift in physical activity patterns among Orang Asli as a sedentary lifestyle has gradually replaced their active lives (Poh et al., 2010, Ithnin et al., 2020). Their knowledge of this physical activity was superficial, in which they thought that a lack of physical activity could only cause obesity and weaken their body. Several participants did not know the importance of the physical activity to health. Many of them have stated in this study that they have a limitation in the conduct of physical activities. The barrier identified in this study for doing physical activities was lack of physical activity facility, environmental influence and also time constraints. A study by Saimon et al. also concluded in 2015 a similar barrier that affects the involvement in physical activity among indigenous communities. Women in this study were more likely to face more obstacles to exercise due to lack of amenities, such as walkways and parks near their homes, and lack of time because they were busy managing their families and homes.

About smoking, many of the Orang Asli knew that smoking is unhealthy and can contribute to diseases. Only one respondent aware of the Quit Smoking Clinic listed in the National Quit Smoking Program by the Division of Disease Control, Ministry of Health Malaysia (2015). This program offers assistance to smokers to discontinue tobacco use and ultimately quit smoking. However, despite the Malaysian government's active campaign to reduce smoking prevalence in Malaysia, Orang Asli appeared to be neglected due to a lack of education and intervention programs targeted at specific populations (Hum, Hsien & Nantha, 2016). Smoking behaviour was a typical activity, especially among Orang Asli (Ahmad et al., 2018). While most of the Orang Asli interviewees understood the danger of smoking to their health, they nevertheless found it difficult to encourage their family members to stop smoking. It was due to peer influence, personal interest, nicotine addiction, and lack of motivation to stop smoking.

Even though most of them knew about the negative effect of excessive alcohol consumption, several participants did not aware of the adverse impact of this behaviour. For those who knew, they stated that alcohol could be detrimental to health because excessive intake could lead to intoxication and death. Furthermore, alcohol consumption had also caused social problems among the Orang Asli. Our study showed that increased alcohol intake by males added considerable stress and anxiety to the villagers. Similar findings were reported in a previous study performed among Orang Asli at a resettlement villager in Selangor (Swainson & McGregor, 2008; Karim & Hashim, 2012). The environmental difference in terms of increased urban-rural interaction had also increased the alcoholism behaviour among Orang Asli. From the interviews, the main driving factors for this behaviour were peer influence, stress, individual desire, and extra money to spend. In previous years, traditional alcoholic drinks were only consumed during festive celebrations (Ali, Shamsuddin & Khalid, 1991). However, in recent years, the modernisation that resulted from the Orang Asli resettlement programmes has fuelled the alcohol problems in these communities. Due to the affordability and availability of alcoholic beverages near their settlements, some of the Orang Asli were spending a lot of their money on the drinks (Swainson & McGregor, 2008; Karim & Hashim, 2012; Gill, Rosnon & Redzuan, 2010).

There were some limitations to this study. Since the interviews were face-to-face, the participants could have received socially acceptable answers. Although the researcher used an in-depth interview approach in this study and permitted definitions to be derived directly from the results, it was possible that the views of the

interviewees did not cover all the factors influencing the behavioural risk determinants of NCDs. Thus, to remove this restriction, the interviews persisted until the data became saturated. This study is also limited in that we have confined our sphere of discussion to the chosen Orang Asli group residing in the fringe settlement of rural areas. Since Orang Asli are not homogeneous, inferences should be made only in the light of future research with comparable populations. The other group of Orang Asli may have had specific facilitation and obstacles to the determinants of the behavioural risk factor for NCDs.

The strengths of this report include the results of the study, which will be very useful in setting the Orang Asli intervention goals, as well as public health policies. In the present research, the awareness and attitudes of individuals and societies towards diseases are critical to health promotion. Studies that explicitly focus on dietary, behavioural and chronic disease awareness among Orang Asli are suggested as a result of rapid nutritional change and lifestyle transformation among Orang Asli communities. This work may provide valuable knowledge to reduce the risk that contributes to the increased prevalence of metabolic risks and NCDs.

Taking into account the social, capital and cultural perspectives, strategies and interventions to monitor NCDs shall be effective and sustainable. A variety of new approaches have been implemented in recent years to increase the uptake of healthy behaviour. By adopting modern technology, it can be empowering, as it serves as a bragging factor and fulfills the purpose to improve healthy behaviour among OAs (Walid et al., 2017). In a study of Indigenous Australian people, the use of digital health trackers enhanced physical activity and improved health awareness of research participants (Maxwell et al., 2019). Exercise aids such as pedometers and cell phone apps can also be integrated into lifestyle behavioural intervention programmes intended for NCDs prevention.

Public health strategies aimed at minimising behavioural risk factors for NCDs are also crucial for the prevention of NCDs. Policies beyond the health sector, such as education, housing, the environment, agriculture and transport, are also beneficial to improve the living environment of the vulnerable population of Orang Asli and thus increase the health of the community.

5. CONCLUSION

The results of the present study indicated that behavioural risk factors of NCDs in Orang Asli are a multifactorial phenomenon. Despite the common misunderstanding that the Orang Asli is facing no barrier in achieving a healthy lifestyle, our qualitative methodology clarified that the also facing obstacle in conducting a healthy lifestyle. In addition to the typical challenges to the practice and implementation of healthy lifestyle behaviours, such as low disease understanding, environmental pressures, socio-economic conditions and social features often play an essential role as a factor leading to unhealthy risk behaviours of NCDs. Since it is unlikely that a 'fits for all' approach to health interventions can be taken mainly in the Orang Asli communities, the control and prevention strategies of the NCDs in Malaysia should take the Orang Asli viewpoint into account. With continuous health education to increased knowledge and sustained effort, there is also scope for far more actions to support healthy behaviours at the community level for the prevention of chronic diseases.

STATEMENT ON CONFLICT OF INTEREST

The authors have no conflicts of interest that are directly relevant to the content of this research.

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Appendix 19: List of Community Outreach Programs

1. Program : Karnival "Sihat Bersama Masyarakat"
Place : Dewan Orang Ramai Kampung Bahagia Jiboi, Ampangan, Seremban
Date : 23 December 2017
Role : Secretary



Appendix 19, continued

2. Program : Karnival Kesihatan "Sihat dan Seimbang Kuala Pilah"
Place : Dewan Dato' Bahaman, Kuala Pilah, Negeri Sembilan
Date : 1 February 2018
Role : Secretary



Appendix 19, continued

3. Program : Program Tautan Kasih "Sihat dan Seimbang"
Place : Kampung Orang Asli Dusun Kubur, Chennah, Jelebu Negeri Sembilan
Date : 6 February 2018
Role : Secretary



Appendix 19, continued

4. Program : Sustainable Education for Indigenous People Seminar (SEIPS) 2018
Place : d'Sora Boutique Business Hotel, Sendayan
Date : 20 April 2018
Role : Oral Presenter and Panel Member in a Round-table Discussion



Appendix 19, continued

5. Program : Community Education & Field training on Identification, Transmission, and Control of Zoonotic Diseases among the Indigenous People (Orang Asli) living in Belum Forest in Perak, Peninsular Malaysia
- Place : Sekolah Kebangsaan RPS Pos Kemar, Royal Belum Forest, Gerik, Perak
- Date : 29-31 March 2019
- Role : Facilitator



Appendix 19, continued

6. Program : Innovation Access for DID KIT and ICHUCHY U Programme
Place : Kampung Orang Asli Ulu Kelaka, Kuala Klawang, Jelebu
Date : 5 October 2019
Role : Facilitator

