

The Chicago Lead Knowledge Test-Malay Version: A Cultural and Linguistic Adaptation for the Malaysian Population

MOHD SHAHROL AW, MOHD HASNI J*, ZALEHA MI

*Department of Community Health, Faculty of Medicine, Universiti Kebangsaan Malaysia
Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur,
Malaysia*

ABSTRAK

Pengetahuan mengenai pendedahan plumbum (Pb) di kalangan kanak-kanak masih kurang baik di kalangan ibu bapa di Malaysia. Tujuan utama kajian ini adalah untuk menterjemahkan versi Bahasa Inggeris Chicago Lead Knowledge Test (CLKT) yang asal ke dalam Bahasa Melayu (bahasa tempatan) dan disesuaikan dengan latar belakang budaya negara ini. Langkah-langkah terjemahan adalah sistematik dan berdasarkan 'International Society for Pharmacoeconomics and Outcome Research' (ISPOR) iaitu persediaan, terjemahan ke depan, perangkuman, terjemahan mundur, penilaian terjemahan mundur, penyelarasan, pembahasan kognitif, penilaian pembahasan kognitif dan semakan akhir, pembacaan prof, dan laporan akhir. Jumlah item adalah kekal 24, di mana satu item dihapus, satu item disemak semula, dan satu item ditambah ke dalam borang soalan kaji selidik. Keempat-empat tema iaitu pengetahuan umum, pendedahan, pencegahan dan pemakanan dalam soal selidik ini dikekalkan. Skala respon, skema jawapan, dan sistem pemarkahan adalah tetap sama. Sebilangan besar item mempunyai terjemahan langsung ke bahasa Melayu kecuali item 5, 7, 12, 20, dan 22. Purata (\pm SD) dan julat interkuartil (IQR) untuk skor keseluruhan pengetahuan adalah 9.50 ± 2.45 markah dan 5 markah masing-masing. Skor terendah adalah 4 markah dan skor tertinggi ialah 13 markah. Ini merupakan satu-satunya kajian yang menggunakan pendekatan sistematik dan standard dalam terjemahan dan penyesuaian budaya di Malaysia. Terjemahan CLKT dan penyesuaian budaya di Malaysia akan menyumbang kepada penyelidikan semasa yang lain terutamanya mengenai pendedahan Pb di kalangan kanak-kanak.

Kata kunci: borang soal selidik, budaya, linguistik, penyesuaian, terjemahan

Address for correspondence and reprint requests: Mohd Hasni Ja'afar. Department of Community Health, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia. Tel: +6019-2061654 Email: drmhasni1965@gmail.com

ABSTRACT

Knowledge about exposure to lead among children is still not good among parents in Malaysia. The purpose of this study was to translate the English version of the original Chicago Lead Knowledge Test (CLKT) into the Malay (local) language systematically and to suit the background culture and language of this country. The steps of systematic translation followed the International Society for Pharmacoeconomics and Outcome Research (ISPOR) standard which consists of preparation, forward translation, reconciliation, backward translation, backward translation review, harmonisation, cognitive debriefing, review of cognitive debriefing and finalisation, proofreading, and final report. The total number of items remained at 24, where one item was deleted, one item was revised, and one item was added into the instrument. All four themes; general knowledge, exposure, prevention and nutrition in this questionnaire were maintained. The response scale, answer scheme, and the scoring system remained the same. Most of the English items had direct translation to Malay language except for items 5, 7, 12, 20 and 22. The mean (\pm SD) and interquartile range (IQR) for total knowledge score was 9.50 ± 2.45 marks and 5 marks, respectively. The lowest score was 4 marks and the highest score was 13 marks. This was be the first known study to utilise the systematic and standardised approaches in the cross-cultural translation and adaptation of the CLKT in Malaysia. The CLKT's cultural and linguistic adaptation in Malaysia may contribute to other current research particularly on lead exposure among children.

Keywords: cultural, linguistic, adaptation, translation, questionnaire

INTRODUCTION

Lead is a commonly found toxic heavy metal and persists for a very long time in the environment due to its non-biodegradable properties (Mitra et al. 2017). Lead exposure among children causes a major public health issue worldwide. Paint is a major source of lead exposure among children in the form of deteriorated chips and dust, and constitutes approximately 70% of cases of elevated blood lead level (BLL) (O'Connor et al. 2018). Another 30% of cases of children with elevated

BLL were exposed to lead sources other than paint i.e. colour pencils, crayon, toys, electronic devices, batteries, ceramics, food, jewelry, petrol, traditional remedies and even human breast milk (Hon et al. 2017). While cigarettes contain heavy metals including lead, exposure to cigarette smoke also causes increased BLL in children (Li et al. 2016). Parents who are involved in the lead-related industrial fields could contribute to take-home contamination by carrying home lead dust from their workplace on their clothes, footwear, skin, and

other personal effects (Hauptman et al. 2017; Newman et al. 2015).

Among all lead poisoning cases, most happened at home as a result of exposure through ingestion of lead-based product or lead in the soil, and inhalation of lead fumes or respirable dust (Lanphear 2017). Lead exposure, even at minute levels, could have irreversible damage on central nervous system of children which result in cognitive disturbance and neural-behaviour problem (Baghurst et al. 1992; Huang et al. 2017; Jusko et al. 2008). A higher concentration of BLL was consistently related to IQ disturbance, language difficulty, reduced academic potential, attention problems and neural-behaviour disorder (Hauptman et al. 2017).

Children pose a unique physiological characteristic and can be considered as a vulnerable group. They have an increased susceptibility to lead poisoning due to their body still being in the growth and development phase (Huang et al. 2017). They generally absorb a higher amount of lead in the digestive tract as much as 50% compared to 20% in the adults (Sullivan & Krieger 2001). The absorption may be boosted further due to starvation or lack of trace elements such as calcium, iron, zinc and magnesium (Li et al. 2016). Liquid form of food is a much better medium for lead absorption compared to solid form (Hon et al. 2017). Children's peak age for lead poisoning is between the age of 18 and 36 months (Lowry et al. 2016). During the peak age, they have the habit of mouthing and are unable to differentiate the object or food that

they put into their mouth (Kwong et al. 2020).

The Centres for Disease Control (CDC) has recommended a primary prevention strategy among families in high risk communities as the best approach to protect children from lead poisoning (Hauptman et al. 2017). Health education can be delivered via formal consultation in the clinics or informal approach through mass media. An interventional study in the United States of America (USA) showed that the family-based educational treatment given during clinic visits was able to increase parental knowledge score about lead and improved their children BLL (Wasserman 2012). A prospective clinical trial done in the USA showed that the videotape of lead knowledge significantly increased the knowledge scores among parents and may reduce the children's risk of lead poisoning (Kersten et al. 2004).

In general, many commonly used questionnaires were first conceived in the countries that spoke English. Accurate and expert translation of questionnaires are vital for achieving good results in populations that do not speak English. The instruments must be translated into desired languages correctly to maintain and achieve its objectives. A systematically multi-steps method must be performed to obtain a good-quality translation. Translation of questionnaire consumes a lot of time and is a labour-intensive process, while at the same time being fraught with complications (Kiing et al. 2016). A translated work must be linguistically equivalent and culturally appropriate. However, it has been observed that

there are inconsistent methods and terms used in the translation process (Su & Parham 2002). Researchers who lack of awareness about good practices in translation and cultural adaptation of questionnaire may affect the quality of the outcome data (Rosnah et al. 2013).

A 24-items Chicago Lead Knowledge Test (CLKT) is one of the popular instruments used globally to assess parental knowledge regarding lead exposure towards children and its prevention strategies. It was originally developed and validated by Mehta and Binns among parents of children aged 6 years or younger who presented for child health care at primary care practices in Chicago urban area in 1998 with primary aim to assess the parents' knowledge about lead and its prevention strategies (Mehta & Binns 1998), and has been used by other researchers with similar objectives (Adebamowo et al. 2006; Huang et al. 2017). It had a very good agreement between test-retest response to individual items 88-100% and strong correlation 0.96 (Mehta & Binns 1998). The CLKT consisted of four main domains; general knowledge (item 1-5), exposure (item 6-16), prevention (item 17-20) and nutrition (item 21-24) with minimum score of zero and maximum score of 24 marks. For individual respondent, a correct response for each item was allocated a score of one mark, while incorrect and 'don't know' answers were zero.

In Malaysia, the prevalence of parental knowledge status about lead health hazard and its prevention in Malaysia is unknown. The validated questionnaire of parental knowledge

about lead has neither been used in Malaysia yet, nor been translated into Malay language. The main objectives of this study are to translate the English version of the original CLKT into Malay language systematically and to suit the cultural and linguistic background of Malaysia.

MATERIALS AND METHODS

This study was conducted at the Department of Community Health, Faculty of Medicine, National University of Malaysia (UKM) Medical Centre and Department of Community Development (KEMAS) Kuala Lumpur from September until November 2019. A wide variety of respondents were included in this study; they are public health physicians and consultants, DrPH scholar doctors, and laymen. Based on a report by the International Society for Pharmacoeconomics and Outcome Research (ISPOR), a translation process (as shown in Figure 1) includes; i) preparation, ii) forward translation, iii) reconciliation, iv) backward translation, v) backward translation review, vi) harmonisation, vii) cognitive debriefing, viii) review of cognitive debriefing and finalisation, ix) proofreading, and x) final report (Wild et al. 2005), and will be discussed in detail in this section.

Step 1: Preparation

A suitable questionnaire to be used in the current study was identified based on a thorough literature review. The CLKT was chosen in view of a very good agreement between test-

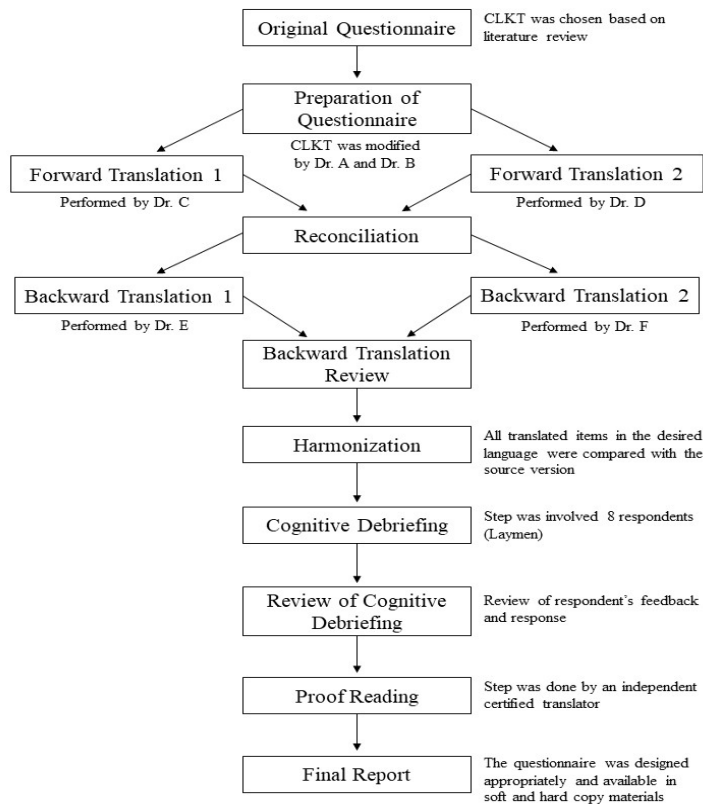


Figure 1: A systematic translation process based on International Society for Pharmacoeconomics and Outcome Research (ISPOR) report.

retest response to individual items 88-100%, strong correlation 0.96, and has been used worldwide (Huang et al. 2017; Kersten et al. 2004; Wasserman 2012). Permission was acquired from the developer of the questionnaire via an e-mail to modify and utilise the instrument. The concept and knowledge about the items used in the questionnaire were gained from article reading and experts' opinion. Two independent experts were invited into a meeting, namely Dr. A and Dr. B. Both were public health physician consultants, with vast experience in environmental health for more

than 10 years. In the meeting, the experts discussed the content of the questionnaire to decide the suitability of the items to be used in Malaysia's setting. The decision to include or to exclude the items were based on the agreement between these two experts. The reasons for inclusion and exclusion of the items were written in detail in special form. Final decision was made by the authors.

Step 2: Forward Translation

This step was conducted by two independent translators, namely Dr. C

and Dr. D. Both are Malaysian citizens, have been living in Malaysia for at least 30 years, able to speak and write fluently in both Malay and English, obtained excellent grades for Malay and English in the compulsory Malaysian Certificate of Education (SPM), and acquired a minimum of Band 4 in the Malaysian University English Test (MUET). They are senior lecturers and public health physician consultants from the Department of Community Health, Universiti Kebangsaan Malaysia (UKM) with vast experience in environmental health for more than 10 years. The experts were provided with information about the measure's conceptual basis and its objectives. The aim of this step was to translate from the original English language into the desired language (Malay) with common terms used in Malaysia, which are easy to understand. At the same time, the conceptual meaning of the questionnaire is preserved. They were briefed on the fundamental concept of the instrument. The source and target versions also had to be conceptually equivalent in four areas such as semantic, idiomatic, experiential, and conceptual. The questionnaires were given to both experts via the e-mail separately. The experts were instructed to complete the translation within a week due to their work commitments. The forward translated questionnaire was then returned to the authors via the e-mail. Two Malay versions of the questionnaire were produced at the end of this step.

Step 3: Reconciliation

This step involved the process of deciding the suitable forward translation. The aim of this step was to modify the items in the forward translation (in some cases, the authors need to change the forward translation entirely) (Rosnah et al. 2013). This step was done in a meeting, attended by the author as the chairperson, together with a variety of team members consisted of experts (Dr. C and Dr. D) and other participants; Master of Public Health (MPH) scholars, Doctoral of Public Health (DrPH) scholars, and Doctor of Philosophy (PhD) scholars without prior knowledge of the translation. The involvement of the participants was believed could help to provide extra opinion and information. In the meeting, two sets of forward translated questionnaires were compared in terms of the structure of the translated sentences, common terms used, and the meaning of the items. Any discrepancy was solved by intensive discussion among the experts and participants. The reconciliation process ended after the agreement of each item was achieved. Items that have been settled must be equivalent and linguistically clear in terms of meaning (semantic, experiential, conceptual and idiomatic). This was a vital step to preclude translation bias; individual writing style, speech habit, or misinterpretation.

Step 4: Backward Translation

This step involved the translation of reconciled items (Malay) into the source language (English). The aim of this step was to ensure that

the Malay translated item has the same conceptual meaning as in the English language. The structure and arrangement of sentences might be different between two languages, but the understanding and fundamentals of each item remain unchanged. The backward translation process was done by another two independent translators; namely Dr. E and Dr. F. Both were Malaysian citizens, have been living in Malaysia for at least 30 years, obtained excellent grades for Malay and English in the compulsory SPM, acquired a minimum of Band 4 level in the MUET, with vast experience in environmental health for more than 10 years. Dr. E was a Deputy Assistant Director in the Environmental Health Sector, Ministry of Health (MOH). Dr. F was the senior lecturer and public health physician consultant from the Department of Community Health, UKM. The reconciled questionnaire (Malay) was sent to the translators separately via the e-mail. The literal translation approach was taken for the back translation. In other words, the translation of an item was based on what was actually said instead of the translators interpreting the item based on what it was supposed to say. However, when idioms or semantics were involved, a few items may have been translated conceptually. The back translation used simple language and the translators were given instructions to that effect. This meant that the normal speech patterns and colloquialisms of the English language were discarded. They were blind to the concepts explored and to the original English items. At the end of this step, the

second English version was generated.

Steps 5: Backward Translation Review

In this step, the backward translated items (English) were compared with the original English version to determine any discrepancy in equivalent concepts. This step was carried out in the meeting attended by the author as the chairperson, the translators (Dr. E and Dr. F), and another different participants from the previous meeting (MPH scholars, DrPH scholars, and PhD scholars) without prior knowledge of the translation from the previous meeting. Both the English and Malay versions were refined to reach an agreement on a satisfactory equivalent version of the instrument (Hasan et al. 2019).

Step 6: Harmonisation

In this step, all translated items in the desired language are compared with the source version. This step ensures consistency between the two. It was done after the back translations. In the same meeting, two sets of backward translated items (English) were compared and reviewed by Dr. E and Dr. F in terms of the structure of the translated sentences, common term used, and meaning of the items. Any discrepancy was solved by intensive discussion among the experts and participants. This process ended after agreement of each item was achieved. Again, the items that were agreed must be equivalent and their meanings should be linguistically clear

(semantic, experiential, conceptual, and idiomatic). This step is crucial to remove any translation bias; individual writing-style, speech habit, or misinterpretation.

Step 7: Cognitive Debriefing

This step was carried out in a group of eight respondents. These respondents were purposely selected from KEMAS Kuala Lumpur, consisted of KEMAS teachers, staff, and person who attended vocational class, with a variety of age, race, origins (from different states of Malaysia), education background, occupation and monthly income. They were Malaysia citizens, have been living in Malaysia for at least 20 years, and able to speak and write very well in Malay language. The aims of cognitive debriefing were; i) to identify difficult or problematic words, ii) to find alternative words which were more understandable, and iii) to evaluate the translated items' degree of comprehensibility, sentence interpretation and cognitive equivalence. The questionnaire was self-administered, in which the respondent needed to answer the questionnaire by themselves. The minimum and maximum time taken for questionnaire completion were recorded. The respondents were then interviewed by the authors to see if any of the translated items were hard to answer, ambiguous, challenging to comprehend, and if the respondent would have asked the question in a different way. Each item was reviewed on a one-by-one basis. The feedback and response by the respondent

for each item were recorded in the respondent response sheet. The structured interview protocol consisted of probing questions such as; i) Did you have difficulty in replying to this question?, ii) Did you find this question confusing?, iii) What does this term mean to you?, iv) How would you ask this question in your own words?, vi) How did you come up with your answer?, and vii) Tell me more about that (Artino Jr et al. 2014; Karlsson et al. 2000).

Step 8: Review of Cognitive Debriefing and Finalisation

In this step, the respondents' feedback and response for each item were reviewed extensively by the author and supervisor. The decision to make a change for the item in terms of word substitution, word deletion, word addition and structure of the sentence was made by the authors. Modification of the Malay-translated version was handled with care to preserve the conceptual meaning of the item. The translation was finalised through the agreement on changes made by the author and supervisor.

Step 9: Proof-reading

The proof-reading of the Malay translated questionnaire was performed by a certified translator. She was a Malaysian citizen, living in Malaysia for more than 30 years, obtained excellent accredited test for Malay in SPM, able to speak and reside fluently in Malay language, with 4 years of translation experience for various documents in

Table 1: The statement of the items and the answer schemes for original-version CLKT and newly modified CLKT

Item	Original-version CLKT		Newly modified CLKT	
	Statement	Correct Answer	Statement	Correct Answer
1	Lead paint chips can be poisonous when eaten	True	Lead paint chips can be poisonous when eaten	True
2	High lead in the body can affect a child's ability to learn	True	High lead in the body can affect a child's ability to learn	True
3	Most children have symptoms right away if they have an elevated blood lead level	False	Most children have symptoms right away if they have an elevated blood lead level	False
4	Apartment owners are required to tell renters about known lead-containing paint in the apartment when a lease is signed#	True	A child's highest blood lead level generally occurs around 5 years of age	False
5	A child's highest blood lead level generally occurs around 5 years of age	False	Lead paint is more likely to be found in newer homes than in older homes	False
6	Lead paint is more likely to be found in newer homes than in older homes	False	Living in a building during renovation or remodelling can increase a child's exposure to lead	True
7	Living in a building during renovation or remodelling can increase a child's exposure to lead	True	One way for children to get lead poisoned is by having lead dust on their hands and then putting their hands in their mouth	True
8	One way for children to get lead poisoned is by having lead dust on their hands and then putting their hands in their mouth	True	A child can become lead poisoned during exposure to lead-containing dust	True
9	A child can become lead poisoned during exposure to lead-containing dust	True	Some kid toys imported from China or other countries is not safe, because it contains lead*	True
10	Some pottery imported from Mexico or other countries is not safe to use in cooking or for eating, because it contains lead	True	Some stationeries such as colour pencil or crayon is not safe, because it contains lead**	True
11	Parents who work with lead at their jobs can bring lead home on their clothes	True	Parents who work with lead at their jobs can bring lead home on their clothes	True
12	The lead a pregnant woman takes into her body can be transferred to the unborn baby	True	The lead a pregnant woman takes into her body can be transferred to the unborn baby	True
13	Lead in soil cannot harm children	False	Lead in soil cannot harm children	False
14	Most cases of childhood lead poisoning are caused by drinking water that contains lead	False	Most cases of childhood lead poisoning are caused by drinking water that contains lead	False
15	Most children get lead poisoned by breathing in lead, rather than by eating or swallowing lead	False	Most children get lead poisoned by breathing in lead, rather than by eating or swallowing lead	False
16	Some herbal or traditional home remedies contain lead	True	Some herbal or traditional home remedies contain lead	True

Original-version CLKT			Newly modified CLKT		
Item	Statement	Correct Answer	Statement	Correct Answer	
17	Washing a child’s hands often helps prevent lead poisoning	True	Washing a child’s hands often helps prevent lead poisoning	True	
18	Warm tap water usually contains less lead than cold tap water	False	Warm tap water usually contains less lead than cold tap water	False	
19	Lead in water can be removed by boiling	False	Lead in water can be removed by boiling	False	
20	Cleaning a home with soap and water decreases the lead in the home more than dusting or sweeping	True	Cleaning a home with soap and water decreases the lead in the home more than dusting or sweeping	True	
21	The human body needs a small amount of lead for good nutrition	False	The human body needs a small amount of lead for good nutrition	False	
22	Less lead is taken up by the body if a child eats a balanced diet, without too many fatty foods	True	Less lead is taken up by the body if a child eats a balanced diet, without too many fatty foods	True	
23	A diet with a good amount of iron-containing foods will help decrease a child’s chance of becoming lead poisoned	True	A diet with a good amount of iron-containing foods will help decrease a child’s chance of becoming lead poisoned	True	
24	A diet with enough calcium helps prevent lead poisoning	True	A diet with enough calcium helps prevent lead poisoning	True	

#Item was removed from the instrument

*Item was revised

**Item was added into the instrument

different fields including thesis and other formal academic materials. Spelling and grammatical errors in Malay language were checked and corrected. The final questionnaire after proofread was understandable by any layman person.

Step 10: Final Report

In this step, a detailed narrative of all the processes of translation was provided in the final report. The report will provide a scientific evidence, may be used as a reference, and also be replicated for similar studies in the future. The new version questionnaire was designed appropriately in terms of font size, graphic design, arrangement

of response scale, number of pages, margin measurement, and colour to provide the ideal instrument and to enhance interest of the respondent while answering the questionnaire. The questionnaire was available in soft and hard copy materials.

RESULTS

Table 1 shows the statement of the items and the answer schemes for the original-version CLKT and newly modified CLKT. The total item number remained 24 after modification of the instrument, where one item was deleted, one item was revised, and one item was added to the instrument. The primary themes; general knowledge,

Table 2: Translation equivalents for the index word in English and Malay language

Item	English Words	Forward Translation			Reconciliation			Backward Translation			Backward Translation Review
		Malay words			Malay words			English Words			
		Translator 1	Translator 2	Translator 2	Translator 1	Translator 1	Translator 2	Translator 1	Translator 2	Translator 2	
1	Chips	Serpih	Kepingan	Serpihan	Serpih Beracun	Flakes Toxic	Fragment Harmful				Fragment Harmful
2	Affect Ability	Mengganggu Kebolehan	Menjejaskan Keupayaan	Mempengaruhi Keupayaan	Mempengaruhi	Affect	Influence				Affect
3	Elevated	Tinggi	Peningkatan	Peningkatan	Serta-merta	Immediately	Acute				Immediate
4	Generally Age	Selalunya Umur	Umumnya Usia	Secara amnya Usia	Secara amnya	Generally	Normally				Generally
5	More likely	Lebih mudah	Lebih senang	Lebih kerap	-	-	-				-
6	-	-	-	-	-	-	-				-
7	Dust Putting	Habuk Memasukkan	Debu Meletakkan	Debu Memasukkan	-	-	-				-
8	-	-	-	-	-	-	-				-
9	-	-	-	-	-	-	-				-
10	-	-	-	-	Pekerjaan Boleh	Work Can	Industry May				Work Can
11	Jobs	Tempat kerja	Pekerjaan	Pekerjaan	Dipindahkan	Pass to	Transport				Be passed
12	Pregnant woman Unborn baby	Wanita mengandung Bayi dalam kandungan	Ibu mengandung Bayi yang belum lahir	Wanita mengandung Bayi di dalam kandungan	-	-	-				-
13	-	-	-	-	-	-	-				-
14	-	-	-	-	-	-	-				-
15	Breathing in	Nafas masuk	Menghirup udara	Menghirup udara	Ubat-ubatan tradisional	Traditional home remedies	Traditional Medicine				Traditional home remedies
16	Some Remedies	Sebahagian Ramuan	Setengah Perawatan	Sebahagian Ramuan	Selalunya	Often	Can				Often

Item	English Words	Forward Translation		Reconciliation	Backward Translation		Backward Translation Review
		Malay words			English Words		
		Translator 1	Translator 2		Translator 1	Translator 2	
17	Often	Selalunya	Secara Kerap	Selalunya	Air paip	Tap water	Tap water
18	-	-	-	-	Melalui	By	Through
19	-	-	-	-	Membersihkan debu	*To ignore the word	*To ignore the word
20	-	-	-	-	Nutrisi yang bagus	Good nutrition	Good nutrition
21	Good nutrition	Nutrisi yang baik	Nutrisi yang bagus	Nutrisi yang bagus	Makanan berlemak	Fatty food	*To ignore the word
22	Less lead	Kurang plumbum	Sedikit plumbum	Kurang plumbum	Peluang	Chance	Possibility
23	Chance	Kemungkinan	Kebarangkalian	Peluang	-	-	-
24	Prevent	Menghindari	Mengelakkan	Mencegah	-	-	-

exposure, prevention and nutrition remained unchanged. However, the number of items for theme general knowledge and exposure were changed due to modification (General knowledge: 4 became 3 items and exposure: 12 became 13 items). The number of items for theme prevention (4 items) and nutrition (4 items) remained the same. The authors maintained the number of response scale ('True', 'False' or 'Don't Know') answer scheme (based on the answer of each statement), and the scoring system (score of 1 mark for correct answer and zero mark for incorrect and 'Don't know' responses). Minimum and maximum score were set at zero and 24 marks.

Both translators had different meanings for index words as shown in Table 2. During forward translation, item 1, 2, 3, 4, 5, 7, 11, 12, 15, 16, 17, 20, 21, 22, 23, and 24 have more than one translation equivalents for the English index word, for example, the English word *chips* can be translated into *serpih* or *kepingan*. The similar findings occurred during backward translation in item 1, 2, 3, 4, 10, 11, 15, 16, 17, 18, 19, 20, 21, and 22, for example, the Malay word *secara amnya* can be translated into *generally* or *normally*. Item 13 had the fewest number of words in the sentence (6 words in both English and Malay version) and was easy to translate. Item 7 had the greatest number of words in the sentence (24 words in English and 19 words in Malay version), which caused trouble during forward and backward translations.

Table 3 shows the details of the

Table 3: Summary of the changes for each item after going through the systematic process of questionnaire translation and cultural adaptation

Finding from each process
<p>Item 1: Lead paint chips can be poisonous when eaten.</p> <p>FT1: Serpilh cat plumbum boleh jadi beracun bila di makan</p> <p>FT2: Kepingan cat ber-plumbum adalah beracun jika dimakan</p> <p>R: Serpihan cat ber-plumbum boleh menjadi racun bila dimakan</p> <p>PRPM: Serpilh cat ber-plumbum boleh menjadi beracun bila dimakan</p> <p>BT 1: Paint flakes can be toxic when it is ingested</p> <p>BT2: Paint fragment could be harmful when ingested</p> <p>BTR: Paint fragment can be harmful when ingested</p> <p>H: Okay</p> <p>CD: Respondents understand the statement clearly.</p> <p>CDR: No change made on the statement.</p> <p>PR: Serpihan cat berplumbum boleh memudaratkan apabila dimakan</p>
<p>Item 2: High lead in the body can affect a child's ability to learn.</p> <p>FT1: Plumbum tinggi dalam badan boleh mengganggu kebolehan kanak kanak belajar.</p> <p>FT2: Plumbum yang tinggi di dalam badan boleh menjejaskan keupayaan kanak-kanak untuk belajar</p> <p>R: Kandungan plumbum yang tinggi di dalam badan boleh mempengaruhi keupayaan pembelajaran kanak-kanak</p> <p>PRPM: Kandungan plumbum yang tinggi di dalam badan boleh mempengaruhi keupayaan pembelajaran kanak-kanak</p> <p>BT 1: High lead concentration in the body can affect children's learning ability.</p> <p>BT2: High level of body lead can influence learning abilities of children</p> <p>BTR: High lead concentration in the body can affect children's learning ability.</p> <p>H: Okay</p> <p>CD: Respondents understand the statement clearly.</p> <p>CDR: No change made on the statement.</p> <p>PR: Kandungan plumbum yang tinggi di dalam badan boleh mempengaruhi keupayaan kanak-kanak untuk belajar.</p>
<p>Item 3: Most children have symptoms right away if they have an elevated blood lead level.</p> <p>FT1: Kebanyakan kanak-kanak menunjukkan gejala serta merta jika mereka mengalami paras plumbum darah yang tinggi.</p> <p>FT2: Kebanyakan kanak-kanak mengalami gejala serta merta jika mereka mengalami peningkatan paras plumbum dalam darah.</p> <p>R: Kebanyakan kanak-kanak menunjukkan gejala serta merta jika mereka mengalami peningkatan paras plumbum dalam darah.</p> <p>PRPM: Kebanyakan kanak-kanak menunjukkan gejala serta merta jika mereka mengalami peningkatan paras plumbum dalam darah.</p> <p>BT 1: Majority of the children show symptoms immediately if they have elevated lead levels in blood.</p>

Finding from each process

BT2: Elevated blood lead level can cause acute poisoning in children

BTR: Most children show immediate symptoms if they have an elevated blood lead level

H: Okay

CD: Respondents suggested to change word gejala with kesan.

CDR: Author decided to maintain the word gejala.

PR: Kebanyakan kanak-kanak menunjukkan gejala serta-merta sekiranya paras plumbum di dalam darah meningkat.

Item 4: A child's highest blood lead level generally occurs around 5 years of age.

FT1: Paras tertinggi darah plumbum seorang kanak-kanak selalunya berlaku di sekitar umur 5 tahun.

FT2: Paras plumbum dalam darah kanak-kanak yang paling tinggi umumnya berlaku sekitar usia 5 tahun

R: Paras plumbum dalam darah kanak-kanak yang paling tinggi secara amnya berlaku sekitar usia 5 tahun

PRPM: Paras plumbum dalam darah kanak-kanak yang paling tinggi secara amnya berlaku sekitar usia 5 tahun

BT 1: The highest blood lead level in children generally occurs around the age of 5 years

BT2: Highest blood lead level among children normally occur among 5 years age group

BTR: Highest blood lead level among children generally occurs around the age of 5 years old

H: Okay

CD: Respondents understand the statement clearly.

CDR: No change made on the statement.

PR: Paras plumbum di dalam darah yang paling tinggi biasanya terdapat pada kanak-kanak sekitar umur 5 tahun.

Item 5: Lead paint is more likely to be found in newer homes than in older homes.

FT1: Cat berplumbum adalah lebih mudah dijumpai dalam rumah yang lebih baru berbanding rumah lebih lama.

FT2: Cat ber-plumbum lebih senang dijumpai di rumah baharu berbanding rumah lama

R: Cat berplumbum adalah lebih kerap dijumpai pada rumah yang lebih baharu berbanding rumah lebih lama.

PRPM: Cat berplumbum adalah lebih mudah dijumpai pada rumah yang lebih baru berbanding rumah lebih lama.

BT 1: Lead paints are easier to be found in newer homes than older ones.

BT2: Leaded paint are commonly found in old building compared to new building.

BTR: Leaded paint are commonly found in older building compared to newer building.

H: Okay

CD: Respondents suggest putting benchmark 1978 as a comparison between newer and older houses.

CDR: Author decided to replace the word newer and older houses with houses built before 1978 and houses built after 1978.

PR: Cat berplumbum lebih mudah dijumpai pada rumah yang dibina selepas tahun 1978 berbanding dengan rumah yang dibina sebelum itu.

Item 6: Living in a building during renovation/remodelling can increase a child's exposure to lead.

Finding from each process

FT1: Tinggal dalam bangunan ketika renovasi / ubah suai boleh meningkatkan dedahan seseorang kanak kanak kepada plumbum.

FT2: Tinggal di dalam rumah ketika ubah suai boleh meningkatkan pendedahan kanak-kanak terhadap plumbum

R: Kanak-kanak yang mendiami di dalam bangunan yang sedang diubahsuai boleh meningkatkan pendedahan kanak-kanak terhadap plumbum

PRPM: Kanak-kanak yang mendiami di dalam bangunan yang sedang diubahsuai / permodelan semula boleh meningkatkan pendedahan kanak-kanak terhadap plumbum.

BT 1: Children who are living in renovated buildings can increase children's exposure to lead.

BT2: Living in a house under renovation/ construction increase risk of exposure among the children

BTR: Living in a house under renovation/ construction increase risk of lead exposure among the children

H: Okay

CD: Respondents understand the statement clearly.

CDR: No change made on the statement.

PR: Kanak-kanak yang berada di dalam rumah yang sedang diubah suai boleh meningkatkan risiko pendedahan mereka terhadap plumbum.

Item 7: One way for children to get lead poisoned is by having lead dust on their hands and then putting their hands in their mouth.

FT1: Satu cara untuk kanak kanak mendapat keracunan plumbum adalah dengan adanya habuk plumbum pada tangan mereka dan kemudian memasukkan tangan itu ke dalam mulut mereka.

FT2: Salah satu cara untuk kanak-kanak mendapat keracunan plumbum adalah ketika mendapat debu plumbum di atas tangan dan meletakkan tangan ke dalam mulut mereka.

R: Salah satu cara bagaimana kanak-kanak mendapat keracunan plumbum adalah dengan memasukkan tangan yang dicemari debu plumbum ke dalam mulut.

PRPM: Salah satu cara bagaimana kanak-kanak mendapat keracunan plumbum adalah dengan memasukkan tangan yang dicemari debu plumbum ke dalam mulut.

BT 1: One of the ways children can get lead poisoning is hand-to-mouth behaviour.

BT2: One of the ways children can get lead poisoning is through putting contaminated hand into mouth.

BTR: One of the ways children can get lead poisoning is through putting contaminated hand into mouth.

H: Okay

CD: Respondents understand the statement clearly.

CDR: No change made on the statement.

PR: Salah satu daripada cara kanak-kanak mendapat keracunan plumbum ialah dengan memasukkan tangan yang dicemari debu plumbum ke dalam mulut.

Item 8: A child can become lead poisoned during exposure to lead-containing dust.

FT1: Seorang kanak kanak boleh menjadi keracunan plumbum semasa dedahan kepada habuk berplumbum.

FT2: Kanak-kanak boleh keracunan plumbum jika terdedah kepada debu yang mengandungi plumbum.

R: Kanak-kanak boleh mendapat keracunan plumbum semasa terdedah kepada debu yang mengandungi plumbum.

PRPM: Kanak-kanak boleh mendapat keracunan plumbum semasa terdedah kepada debu yang mengandungi plumbum.

Finding from each process

BT 1: Children can get lead poisoning when exposed to lead-contaminated dust.

BT2: Lead poisoning can occur in children via exposure to dust-containing lead

BTR: Lead poisoning can occur in children via exposure to lead-containing dust

H: Okay

CD: Respondents understand the statement clearly.

CDR: No change made on the statement.

PR: Kanak-kanak boleh mengalami keracunan plumbum semasa terdedah kepada debu plumbum

Item 9: Some kid toys imported from China or other countries is not safe, because it contains lead.

FT1: Sebahagian permainan kanak-kanak yang diimport dari China atau negara lain adalah tidak selamat, kerana ia mengandungi plumbum.

FT2: Sebahagian permainan kanak-kanak yang diimport dari China atau negara lain adalah tidak selamat, kerana ia mengandungi plumbum.

R: Sebahagian permainan kanak-kanak yang diimport dari China atau negara lain adalah tidak selamat, kerana ia mengandungi plumbum.

PRPM: Sebahagian barang mainan kanak-kanak yang diimport dari China atau negara lain adalah tidak selamat, kerana ia mengandungi plumbum.

BT 1: Some children's toys which are imported from China or other countries are unsafe, because they contain lead

BT2: Some of toys imported from China or other countries is not safe for children as it contains lead

BTR: Some of kid toys imported from other countries especially China is not safe for children as it contains lead

H: Okay

CD: Respondents understand the statement clearly.

CDR: No change made on the statement.

PR: Sebahagian daripada barang mainan yang diimport dari negara lain terutama dari China adalah tidak selamat kerana mengandungi plumbum.

Item 10: Some stationeries such as color pencil or crayon is not safe, because it contains lead.

FT1: Sebahagian alat tulis seperti pensil bewarna atau krayon adalah tidak selamat, kerana ia mengandungi plumbum.

FT2: Sebahagian alat-alat tulis seperti pensil warna atau krayon adalah tidak selamat, kerana ia mengandungi plumbum.

R: Sebahagian alat tulis seperti pensil bewarna atau krayon adalah tidak selamat, kerana ia mengandungi plumbum.

PRPM: Sebahagian alat tulis seperti pensil bewarna atau krayon adalah tidak selamat, kerana ia mengandungi plumbum.

BT 1: Some stationeries such as color pencils or crayon are unsafe, because they contain lead

BT2: Some of stationeries is not safe for children as it contains lead

BTR: Some stationeries such as color pencil or crayon is not safe for children as it contains lead

H: Okay

CD: Respondents understand the statement clearly.

CD Review: No change made on the statement.

Finding from each process

PR: Sebahagian alat tulis seperti pensil bewarna atau pensil krayon adalah tidak selamat kerana mengandungi plumbum.

Item 11: Parents who work with lead at their jobs can bring lead home on their clothes.

FT1: Ibu bapa yang bekerja dengan plumbum di tempat kerja boleh membawa balik plumbum pada pakaian mereka.

FT2: Ibu bapa yang bekerja dengan plumbum dalam pekerjaan mereka boleh membawa plumbum ke rumah melalui pakaian mereka.

R: Ibu bapa yang bekerja dengan plumbum dalam pekerjaan mereka boleh membawa balik plumbum pada pakaian mereka.

PRPM: Ibu bapa yang bekerja dengan plumbum dalam pekerjaan mereka boleh membawa balik plumbum pada pakaian mereka.

BT 1: Parents who are exposed to lead at work can bring lead dust home on their clothes.

BT2: Parent working in lead industries may bring home lead from their contaminated attire

BTR: Parent who exposed to lead at work can bring lead dust home on their clothes.

H: Okay

CD: Respondents understand the statement clearly.

CDR: No change made on the statement.

PR: Ibu bapa yang terdedah kepada plumbum di tempat kerja boleh membawa balik debu plumbum ke rumah melalui pakaian mereka.

Item 12: The lead a pregnant woman takes into her body can be transferred to the unborn baby.

FT1: Plumbum yang diambil oleh wanita mengandung ke dalam badannya boleh dipindahkan kepada bayi dalam kandungan.

FT2: Plumbum yang ibu mengandung ambil ke dalam badannya boleh dipindahkan kepada bayi yang belum lahir.

R: Plumbum yang diambil oleh wanita mengandung ke dalam badannya boleh dipindahkan kepada bayi dalam kandungan.

PRPM: Plumbum yang diambil oleh wanita mengandung ke dalam badannya boleh dipindahkan kepada bayi yang belum lahir.

BT 1: A pregnant woman who has lead in her body can pass it to her unborn baby

BT2: Lead could be transported from pregnant woman to the unborn baby

BTR: Lead could be passed from pregnant women to the unborn baby

H: Okay

CD: Respondents understand the statement clearly.

CDR: No change made on the statement.

PR: Plumbum boleh dipindahkan daripada wanita mengandung kepada bayi di dalam kandungan.

Item 13: Lead in soil cannot harm children.

FT1: Plumbum di dalam tanah tidak membahayakan kanak-kanak.

FT2: Plumbum di dalam tanah tidak boleh membahayakan kanak-kanak.

R: Plumbum di dalam tanah tidak boleh membahayakan kanak-kanak.

PRPM: Plumbum di dalam tanah tidak boleh membahayakan kanak-kanak

Finding from each process

Item 13: Lead in soil cannot harm children.

FT1: Plumbum di dalam tanah tidak membahayakan kanak kanak.

FT2: Plumbum di dalam tanah tidak boleh membahayakan kanak-kanak.

R: Plumbum di dalam tanah tidak boleh membahayakan kanak-kanak.

PRPM: Plumbum di dalam tanah tidak boleh membahayakan kanak-kanak

BT 1: The lead in the soil can do no harm to children.

BT2: Lead in soil is not harmful to children

BTR: Lead in soil is not harmful to children

H: Okay

CD: Respondents understand the statement clearly.

CDR: No change made on the statement.

PR: Plumbum pada tanah tidak memudaratkan kanak-kanak.

Item 14: Most cases of childhood lead poisoning are caused by drinking water that contains lead.

FT1: Kebanyakan kes keracunan plumbum kanak kanak adalah disebabkan oleh air minum yang mengandungi plumbum.

FT2: Kebanyakan kes keracunan plumbum kanak kanak adalah disebabkan oleh minum air yang mengandungi plumbum.

R: Kebanyakan kes keracunan plumbum kanak kanak adalah disebabkan oleh air minum yang mengandungi plumbum

PRPM: Kebanyakan kes keracunan plumbum kanak kanak adalah disebabkan oleh air minum yang mengandungi plumbum.

BT 1: Most of lead poisoning cases in children are due to lead in drinking water

BT2: Most of lead poisoning cases in children are due to drinking of lead contaminated water

BTR: Most of lead poisoning cases in children are due to drinking of lead contaminated water

H: Okay

CD: Respondents understand the statement clearly.

CDR: No change made on the statement.

PR: Kebanyakan kes keracunan plumbum dalam kalangan kanak-kanak disebabkan meminum air yang dicemari plumbum.

Item 15: Most children get lead poisoning by breathing in lead, rather than by eating or swallowing lead.

FT1: Kebanyakan kanak-kanak mendapat keracunan plumbum melalui nafas masuk plumbum, melebihi dari memakan atau menelan plumbum.

FT2: Kebanyakan kanak-kanak mendapat keracunan plumbum melalui menghirup udara yang mengandungi plumbum, daripada melalui makan atau menelan plumbum.

R: Kebanyakan kanak-kanak mendapat keracunan plumbum melalui menghirup udara yang mengandungi plumbum, berbanding memakan atau menelannya.

PRPM: Kebanyakan kanak-kanak mendapat keracunan plumbum melalui menghirup udara yang mengandungi plumbum, berbanding memakan atau menelannya.

BT 1: Most children get lead poisoning by inhaling lead-containing dust in the air, rather than eating or swallowing it.

Finding from each process

BT2: Most children get lead poisoning by inhaling lead-containing dust in the air, rather than eating or swallowing it.

BTR: Most children get lead poisoning by inhaling lead-containing dust in the air, rather than eating or swallowing it.

H: Okay

CD: Respondents understand the statement clearly.

CDR: No change made on the statement.

PR: Kebanyakan kanak-kanak mengalami keracunan plumbum melalui udara berplumbum yang dihirup berbanding memakannya.

Item 16: Some herbal or traditional home remedies contain lead.

FT1: Sebahagian herbal atau ramuan tradisional rumah mengandungi plumbum.

FT2: Sesetengah herba atau perawatan tradisional rumah mengandungi plumbum.

R: Sebahagian herba atau ramuan tradisional rumah mengandungi plumbum.

PRPM: Sebahagian herba atau ubat-ubatan tradisional rumah mengandungi plumbum.

BT 1: Some herbs or traditional home remedies contain lead.

BT2: Some of herb and traditional medicine may contain lead.

BTR: Some herbs or traditional home remedies contain lead.

H: Okay

CD: Respondents suggested to change the word dibuat with dihasilkan.

CDR: Author decided to change the word dibuat with dihasilkan.

PR: Sebahagian daripada herba atau ubat tradisional yang dihasilkan di rumah mengandungi plumbum.

Item 17: Washing a child's hands often helps prevent lead poisoning.

FT1: Membasuh tangan kanak-kanak selalunya dapat bantu menghalang keracunan plumbum.

FT2: Membasuh tangan kanak-kanak secara kerap dapat membantu elak dari keracunan plumbum.

R: Membasuh tangan kanak-kanak selalunya dapat bantu mencegah keracunan plumbum.

PRPM: Membasuh tangan kanak-kanak selalunya dapat bantu mencegah keracunan plumbum.

BT 1: Washing children's hands often help prevent lead poisoning.

BT2: Washing children's hand can prevent lead poisoning.

BTR: Washing children's hands often help prevent lead poisoning.

H: Okay

CD: Respondents understand the statement clearly.

CDR: No change made on the statement.

PR: Dengan membasuh tangan, kanak-kanak selalunya dapat mencegah keracunan plumbum.

Item 18: Warm tap water usually contains less lead than cold tap water.

FT1: Air paip yang suam selalunya mengandungi kurang plumbum berbanding paip air sejuk.

FT2: Air paip yang suam selalunya mengandungi kurang plumbum berbanding air pair yang sejuk.

R: Air paip yang suam selalunya mengandungi kurang plumbum berbanding air paip yang sejuk.

Finding from each process

PRPM: Air paip yang suam selalunya mengandungi kurang plumbum berbanding air paip yang sejuk.

BT 1: Warm tap water often contains less lead than cold tap water.

BT2: Warm pipe water contains less lead as compared to cold pipe water

BTR: Warm tap water contains less lead than cold tap water.

H: Okay

CD: Respondents understand the statement clearly.

CDR: No change made on the statement.

PR: Air paip yang suam selalunya mengandungi kurang plumbum berbanding dengan air paip yang sejuk

Item 19: Lead in water can be removed by boiling.

FT1: Plumbum dalam air boleh disingkir dengan pendidihan.

FT2: Plumbum di dalam air boleh disingkirkan melalui pendidihan.

R: Plumbum di dalam air boleh disingkirkan melalui proses pendidihan.

PRPM: Plumbum di dalam air boleh disingkirkan melalui proses mendidih.

BT 1: The lead in the water can be removed by boiling.

BT2: Lead in drinking water can be removed through boiling.

BTR: Lead in drinking water can be removed through boiling.

H: Okay

CD: Respondents understand the statement clearly.

CDR: No change made on the statement.

PR: Plumbum di dalam air boleh disingkirkan melalui proses mendidih air.

Item 20: Cleaning a home with soap and water decreases the lead in the home more than dusting or sweeping.

FT1: Membersihkan rumah dengan sabun dan air dapat kurangkan plumbum dalam rumah berbanding pendebuan atau penyapuan.

FT2: Membersihkan rumah dengan sabun dan air mengurangkan plumbum di dalam rumah lebih dari mendebu atau menyapu.

R: Membersihkan rumah dengan sabun dan air mengurangkan plumbum di dalam rumah berbanding membersihkan debu atau menyapu.

PRPM: Membersihkan rumah dengan sabun dan air mengurangkan plumbum di dalam rumah berbanding membersihkan debu atau menyapu.

BT 1: Cleaning the house with soap and water reduces the lead dust in the house rather than sweeping it.

BT2: Cleaning the house with soap and water can reduces lead in the house than sweeping the dust.

BTR: Cleaning the house with water and soap can reduces lead in the house than sweeping.

H: Okay

CD: Respondents suggest removing the word sabun.

CDR: To remove the word sabun.

PR: Membersihkan rumah dengan air dapat mengurangkan plumbum di dalam rumah berbanding dengan menyapu.

Item 21: The human body needs a small amount of lead for good nutrition.

Finding from each process

FT1: Badan manusia perlukan sedikit jumlah plumbum untuk nutrisi yang baik.

FT2: Badan manusia memerlukan sedikit jumlah plumbum untuk nutrisi yang bagus.

R: Badan manusia memerlukan sedikit jumlah plumbum untuk nutrisi yang bagus

PRPM: Badan manusia memerlukan sedikit jumlah plumbum untuk nutrisi yang bagus.

BT 1: The human body needs a small amount of lead as good nutrition.

BT2: Our body need small amount of lead to remain healthy.

BTR: The human body needs a small amount of lead for good nutrition.

H: Okay

CD: Respondents understand the statement clearly.

CDR: No change made on the statement.

PR: Badan manusia memerlukan sedikit plumbum untuk nutrisi yang bagus.

Item 22: Less lead is taken up by the body if a child eats a balanced diet, without too many fatty foods.

FT1: Kurang plumbum diserap masuk oleh badan kanak kanak yang makan diet seimbang, tanpa terlalu banyak makanan berlemak.

FT2: Sedikit plumbum diambil oleh tubuh badan jika kanak-kanak makan makanan yang seimbang, tanpa makanan yang terlalu berminyak.

R: Kurang plumbum diambil oleh badan jika kanak kanak makan diet yang seimbang, tanpa terlalu banyak makanan berlemak.

PRPM: Kurang plumbum diambil oleh badan jika kanak kanak makan diet seimbang, tanpa terlalu banyak makanan berlemak.

BT 1: Less lead is absorbed by the body if a child eats a balanced diet, without too much fatty foods.

BT2: Eating a balanced diet helps to reduce intake of lead among children.

BTR: Less lead is absorbed by the body if a child eats a balanced diet.

H: To remove words without too much fatty foods.

CD: Respondents understand the statement clearly.

CDR: No change made on the statement.

PR: Hanya sedikit plumbum yang akan diserap oleh badan sekiranya kanak-kanak memakan diet yang seimbang.

Item 23: A diet with a good amount of iron-containing foods will help decrease a child's chance of becoming lead poisoned.

FT1: Diet dengan jumlah mencukupi makanan mengandungi zat besi akan membantu mengurangkan kemungkinan kanak kanak mengalami keracunan plumbum.

FT2: Diet dengan jumlah makanan mengandungi zat besi yang mencukupi akan membantu mengurangkan kebarangkalian kanak-kanak untuk menjadi keracunan plumbum.

R: Diet yang mempunyai jumlah zat besi yang mencukupi dapat membantu mengurangkan peluang kanak-kanak mendapat keracunan plumbum

PRPM: Diet yang mempunyai jumlah zat besi yang mencukupi dapat membantu mengurangkan peluang kanak-kanak mendapat keracunan plumbum.

BT 1: A diet with sufficient iron content can help reduce the chances of children getting lead poisoning.

BT2: Diet contain sufficient iron help reduce possibility of lead poisoning.

Finding from each process

BTR: A diet contain sufficient iron help reduce the risk of lead poisoning.

H: Okay

CD: Respondents understand the statement clearly.

CDR: No change made on the statement.

PR: Diet yang mengandungi zat besi yang mencukupi membantu mengurangkan risiko keracunan plumbum.

Item 24: A diet with enough calcium helps prevent lead poisoning.

FT1: Diet dengan cukup kalsium membantu menghindari keracunan plumbum.

FT2: Diet dengan kalsium yang mencukupi membantu mengelakkan keracunan plumbum.

R: Diet dengan kalsium yang mencukupi membantu mencegah keracunan plumbum.

PRPM: Diet dengan kalsium yang mencukupi membantu mencegah keracunan plumbum.

BT 1: A diet with sufficient calcium helps prevent lead poisoning.

BT2: A diet with sufficient calcium helps prevent lead poisoning.

BTR: A diet with sufficient calcium helps prevent lead poisoning.

H: Okay

CD: Respondents understand the statement clearly.

CDR: No change made on the statement.

PR: Diet yang mengandungi kalsium yang mencukupi membantu mencegah keracunan plumbum.

FT1=Forward translator 1; FT2=Forward translator 2; R=Reconciliation; PRPM=Pusat Rujukan Persuratan Melayu (Translation checking); BT1=Backward translator 1; BT2=Backward translator 2, BTR=Backward translation review; H=Harmonization; CD=Cognitive debriefing; CDR=Cognitive debriefing review; PR=Proof read

finding for each item after going through the different level of translation process and cultural adaptation. Despite having a discrepancy of translation words, the knowledge and the concept of each item were preserved. Most of the items had a direct translation to Malay language except for item 5, 7, 12, 20, and 22. For item 5, parts of the sentence *newer homes than in older homes* were replaced with *houses built before 1978 and houses built after 1978*. For item 7, parts of the sentence *having lead dust on their hands* were removed. For item 12, parts of the sentence *the lead a pregnant woman takes into her body* were removed. For item 20, the word *soap* was removed.

For item 22, parts of the sentence *without too much fatty foods* were removed.

A total of eight respondents were recruited during the cognitive (\pm SD) for each domain; general knowledge, exposure, prevention and nutrition was 1.75 (\pm 0.71), 4.50 (\pm 0.93), 1.13 (\pm 0.64) and 2.13 (\pm 0.64), respectively. The interquartile range (IQR) was 1 mark for each domain. Only one respondent scored zero for domain prevention (which also scored the lowest for the total knowledge score). The mean (\pm SD) and IQR for the total knowledge score recorded was 9.50 (\pm 2.45) marks and 5 marks, respectively. The average knowledge level of the respondents

during cognitive debriefing was found to be moderate (9 to 16 marks). The lowest total knowledge score was 6 marks and the highest total knowledge score was 13 marks. The time taken to complete the questionnaire was ranging from 8 to 15 minutes. The respondents were able to understand the Malay sentence of each item very well at first attempt.

DISCUSSION

Several studies applied different methods of translation and cultural adaption on the questionnaire (Maneesriwongul & Dixon 2004). However, the more systematic way on translation process and cultural adaptation was adapted in the current study based on the ISPOR standard as the authors believed that the Malay language with different dialect and meaning in Malaysia should be translated with care and detail. As far as can be ascertained, this will be the first study to adopt systematic and standardised methods to translate and adapt the CLKT cross-culturally in Malaysia and other Malay speaking countries like Indonesia, Singapore and Brunei. The process of translating the instrument was stringent, time consuming and involved many people (experts and laymen). Throughout the study, the authors have discussed with the experts and came into agreement in modification of the items, choosing the correct words and sentences, face validity and feasibility of the instrument to avoid unnecessary translation bias. The instrument was modified due to difference of exposure in term

of socio-demographic background, economy, environment and legal implementation in Malaysia compared to the USA. The modification was performed in the current study in careful manner to preserve the quality of response scale and scoring system of the instrument. The authors decided to remove one item from the original instrument (Statement: Apartment owners are required to tell renters about known lead-containing paint in the apartment when a lease is signed) due to irrelevant implementation in Malaysia. As what has been practiced in the USA, it is a requirement by the federal law for housing built before 1978 that renters must receive all information about lead from the house owner before signing the lease as following; i) the Environmental Protection Agency (EPA) approved information pamphlet on identifying and controlling lead-based paint hazards, ii) any known information concerning the presence of lead-based paint or hazards in the house, and iii) an attachment to the contract that includes a 'Lead Warning Statement' (U.S. Environmental Protection Agency 2019). While in Malaysia, the rent control was currently governed by the Control of Rent (Repeal) Act 1997 which replaced the previous Control of Rent Act 1966 (Federal Government Gazette 1997). This act focuses more on fair rent and recovery of possession of controlled premises. Unfortunately, the disclosure about lead health hazards and its prevention through legal rental agreement is neither been mentioned in the law nor widely practiced in Malaysia.

The authors agreed to revise and modify one item from the original instrument (Statement: Some pottery imported from Mexico or other countries is not safe to use in cooking or for eating, because it contains lead). From the expert's point of view, the children are more exposed towards toys instead of potteries as they are easily available at home and kindergarten, and because of children's behaviour of licking or sucking the toys, or in the worst case when they swallow a toy or a piece of a toy (Njati & Maguta 2019). In fact, the toys are always introduced very early to the baby. Previous study found that the toys for toddler had higher lead content compared to the toys for other preschool age (Sun et al. 2018). Most of the toys imported from China contain high lead compared to other countries (Njati & Maguta 2019). In addition, painted toy at the metal, plastic, and wood surfaces were found to have high lead content (Cui et al. 2015; Meyer et al. 2008). Therefore, the statement for this item was modified into "Some kids toys imported from China or other countries are not safe, because it contains lead". The authors also agreed to add one item into the instrument (Statement: Some stationeries such as colour pencil or crayon is not safe, because it contains lead). Beside toys, children have more contact with the colour pencils and crayon while drawing or colouring. Colour pencil and crayon are the most common type of stationeries which contain high lead (Okonkwo & Maribe 2004; Romieu et al. 1994). Children who tend to bite the pencils and ingest the chips may exposed themselves to

this source of lead and may contribute to the total body burden (Okonkwo & Maribe 2004). Previous studies' finding showed the relationship between the ingestion of colour pencils and high level of BLL among children (Gorospa & Gerstenberger 2008; López-Carrillo et al. 1996; Olaiz et al. 1996).

The authors referred to an open access online service vocabulary called Malay Literary Reference Centre or Pusat Rujukan Persuratan Melayu (PRPM) for verification of the translated words (from English to Malay and vice versa). This search engine was provided by the Institute of Language and Literature, also known as *Dewan Bahasa dan Pustaka* (DBP) and enables users to search information holistically across all DBP databases; dictionary, terms, encyclopedias, poetry, cultural language, dialect, proverbs, archive query language, Malay language thesaurus, and content of other websites as determined by DBP (Institute of Language and Literature 2017).

There was no fixed rule to assign the translators. As recommended by ISPOR standard (Wild et al. 2005), the criteria to be well-qualified translator are; i) professional translators, ii) native speakers of the target language and fluent in the source language, usually English, iii) familiar with both cultures, and iv) knowledgeable in the content of the instruments or tools under assessment. In this study, all translators (Dr. A, Dr. B, Dr. C, Dr. D, Dr. E and Dr. F) were eligible to translate the questionnaire. The utilisation of more than one translator in the process gives more perspectives and better

outcomes (Epstein et al. 2015). Due to financial constraint, the authors did not assign the certified translator, instead, appointed the translators from doctors and lecturers who are well verse in environmental toxicology. Another reason would be, when the translators were among the subject matter experts, the authors did not have to re-brief or provide additional knowledge.

The translation process was quite challenging because some of the items could not be directly translated. One word might have various meanings in another language and can be considered as being a more complex unit (Harkness et al. 2004). When the authors could not determine a good translation equivalent, a maneuver was done to suit the original meaning as in item 4 and 6. For item 4, the words *child's highest blood lead level* were translated into *paras plumbum dalam darah kanak-kanak yang paling tinggi*. For item 6, the words *living in a building* were translated into *kanak-kanak yang mendiami di dalam bangunan*. In special circumstances, the words and the sentence structure should be modified or be improved to suit the thinking process of an average person (Harkness et al. 2004; McKay et al. 1996). For item 5, during cognitive debriefing, the respondents had confusion with the statement of this item. They misinterpreted the *newer home* as the first-hand house and the *older home* as the second-hand or used house. The knowledge about the use of indoor lead-based paint in houses built before 1978 was beyond their thinking. They suggested

using the benchmark word *1978* to differentiate those kinds of houses. The number of words in Malay sentences are usually more than translated equivalence English sentences. Length of word and sentence, and word frequency will affect the readability and comprehensibility. In other words, the usage of longer words, longer syllables, and longer sentences makes texts more difficult to comprehend (Lenzner 2014). To make the sentences shorter and at the same time preserve the conceptual meaning, the author decided to remove certain words as in item 7, 12, 20 and 22.

A good questionnaire design allows the content to take the front seat. Self-completed questionnaires required a careful construction. The ideal questionnaire design would be in readable font, well organised, sufficient space between items, easy to navigate, clear distinguishable questions from response scale, adequate length and single point of question, unambiguous and clear wording, and use of mechanical devices such as arrows, boxes, asterisks and other symbols (Bee & Murdoch-Eaton 2016).

The achievement of cultural and linguistic equivalence in the newly modified instrument is vital to amplify the points of comparison in results produced in different cultures. A pilot study needed to be carried out after extensive translation and cultural adaptation processes to assess the appropriateness of the Malay-version CLKT to the parents of pre-school children in Kuala Lumpur, Malaysia. The present study was done in a small scale to examine the feasibility of

the questionnaire and score pattern among the parents. In future pilot test, the respondents will answer the survey in the planned delivery mode (paper-based format). The data acquired from the pilot test will then be analysed statistically to describe the distribution of response by item and to measure the reliability and validity of the instrument.

CONCLUSION

The original English version CLKT was translated and cross-culturally adapted to Malay language using established international standards. The instrument that was produced is presently being validated by the authors. The authors believed that the cultural and linguistic adaptation of the CLKT for Malaysian population will result in valuable input and supplement work currently being carried out in other places. A robust translation process and cultural adaptation conducted in this study produced a culturally equivalent Malay version of the CLKT when compared with the original English instrument.

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