

Validation and Development of a Modified Chinese Version Competency Scale in Demonstrating and Assessing Meter-dose Inhaler plus Whistle Mask Spacer Technique

Lee WK, Tse CH, Wong WH, Poon YP

Lee Wing Ki
Advanced Practice Nurse
Department of Paediatrics and Adolescent Medicine
Caritas Medical Centre
Hong Kong

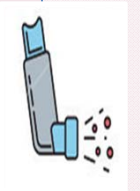


Introduction



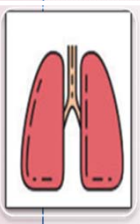
Asthma is the most prevalent chronic disease in paediatric in Hong Kong

(Leung, 1999)



Asthma affected 10% local children

(Wong, 2010)



over 6000 hospital discharge and death due to asthma, 33.6% accounted for the children asthma

(Population health survey, 2004)

➡ 74% of those admitted to the hospital with severe asthma could have had the admission prevented by more appropriate prior care

(Blainey, 1990)

Problem identified



Incorrect pressurized metered-dose inhaler (MDI) technique of patients
(Lexley, 2002)

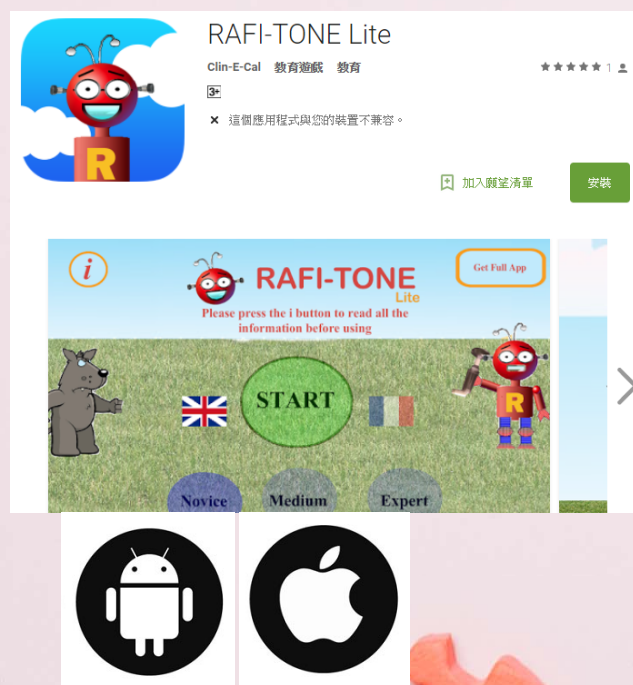


children with the problems of accepting a spacer
(Kamps, 2000)



lack of skill and knowledge in both demonstration and assessment of inhalation technique
(Gilberto, 2016)

“Rafi” app and whistle mask spacer





What did the study do?

- ⌚ The app + whistle mask spacer help nurses to improve the competency in education on MDI inhalation
- ⌚ Develop the competency scale
(i.e. knowledge, attitude and practice (KAP))
→ lack of scale for use in clinical setting in measuring nurses' KAP on education of using MDI in Paediatric patients



Aims

- ④ to perform psychometric properties in instrument evaluation of reliability and validity of a modified Chinese version pediatric nurses' competency scale in demonstrating and assessing metered-dose inhaler (MDI) plus whistle masks spacer technique in the paediatric clinical practice in Hong Kong.



Objectives

- ④ Develop and validate a modified, Chinese version competency scale measuring paediatric nurses' competency (knowledge, attitude and practice (KAP)) in demonstrating and assessing MDI plus whistle mask spacer technique among paediatric nurses In Hong Kong.
- ④ Assess psychometric properties of the instrument.



DESIGN AND SETTINGS





Design and Setting

Period	August to October 2017
Venue	local hospital in Hong Kong
Setting	Ward admitted paediatric patients under acute medical condition
Method	quantitative study quasi-experimental design without control group using pre- and post-tests measures
Sample	convenience sampling: 38 paediatric nurses recruited

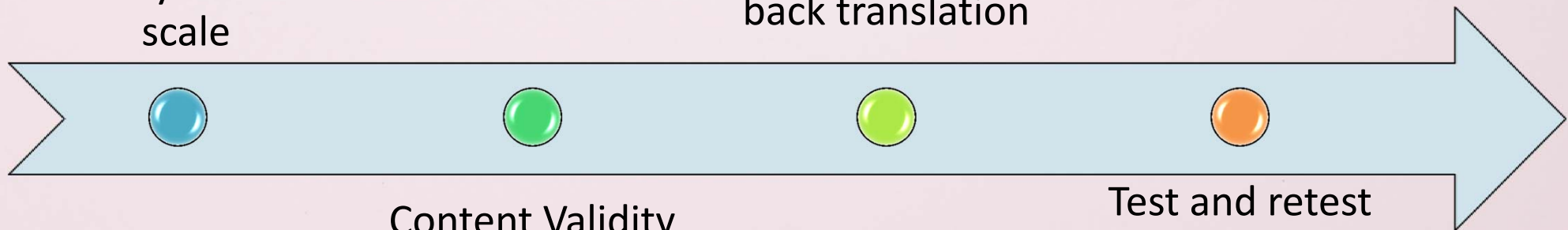
Design

Comprehensive
Literature
review to
modify the KAP
scale

Translation and
back translation

Content Validity
by 5 experts

Test and retest
done in 2
weeks apart



modified scale to measure the paediatric nurses' competency (KAP) in using the MDI plus whistle mask spacer technique

Appendix 1. Nursing knowledge, attitude and practice on using Metered-dose Inhaler (MDI) by whistle mask spacer in paediatric patients.

Nursing knowledge toward education on using Metered-dose Inhaler (MDI) by whistle mask spacer in Paediatric patients					
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. 我知道如何準確地使用計量劑吸入器。 I know how to use MDI accurately.	1.	2.	3.	4.	5.
2. 我知道如何準確地使用吸嘴輔助器。 I know how to use spacer accurately.	1.	2.	3.	4.	5.
3. 我知道如何正確地清潔吸嘴輔助器。 I know how to clean the spacer correctly.	1.	2.	3.	4.	5.
4. 我知道如何選擇合適的呼吸罩和吸嘴輔助器予病童。 I know how to select the appropriate breathing mask and spacer for paediatric patient.	1.	2.	3.	4.	5.
Nursing Attitudes toward education on using Metered-dose Inhaler (MDI) by whistle mask spacer in Paediatric patients					
1. I think that effective education on using MDI to patient/parents/carer in paediatric patients can improve nursing outcome. 我認為在兒科有效地教育病人/家長/照顧者如何使用計量劑吸入器能改善護理效益。	1.	2.	3.	4.	5.
2. I believe that accurate use of spacer to deliver MDI can reduce the readmission of asthmatic patients. 我相信準確地使用吸嘴輔助器吸入藥物計量劑吸入器能減少哮喘病人再次入院。	1.	2.	3.	4.	5.
3. I believe that appropriate pre-discharge education to patients/parent/carer on using MDI or spacer is important. 我認為在病人出院前適當地教育病人/家長/照顧者如何使用計量劑吸入器或吸嘴輔助器是重要的。	1.	2.	3.	4.	5.
4. If patient/parent/carer encounters problem in using MDI or spacer, I am happy to answer their query. 如病人/家長/照顧者在使用吸嘴輔助器或計量劑吸入器時	1.	2.	3.	4.	5.

遇到問題,我樂意回答提問。	1.	2.	3.	4.	5.
5. Nurses should assess the ability of patient/parents/carer to understand the use of spacers or MDI. 護士應評估病人/家長/照顧者對使用吸嘴輔助器或計量劑吸入器的理解能力。	1.	2.	3.	4.	5.
6. Nurses have the responsibility to educate how to use the spacer in order to enhance nursing outcome. 護士有責任教導病人/家長/照顧者正確地使用吸嘴輔助器,以達到更大的護理效益。	1.	2.	3.	4.	5.
7. I shall regularly update my knowledge in using spacer or MDI. 我會定期更新使用吸嘴輔助器或計量劑吸入器的知識。	1.	2.	3.	4.	5.
Nursing Practice performance toward education on using Metered-dose Inhaler (MDI) by whistle mask spacer in Paediatric patients					
1. 我會向病人/家長/照顧者解釋準確地使用計量劑吸入器的重要性。 I shall explain to patient/parent/carer the importance of using MDI accurately.	1.	2.	3.	4.	5.
2. 我經常對病人/家長/照顧者加強準確地使用計量劑吸入器的重要性,即使他們並不是第一次接觸計量劑吸入器。 I always reinforce the importance of using MDI accurately to patient/parent/carer, even though they are not using the MDI the first time.	1.	2.	3.	4.	5.
3. 如病人/家長/照顧者未能妥善地使用吸嘴輔助器吸入藥物(計量劑吸入器),我會嘗試循他們的學習能力,尋找其他方法教導他們。 If patient/parent/carer cannot use the spacer (MDI) appropriately, I shall try to find other method of educating them according to their learning ability.	1.	2.	3.	4.	5.
4. 在病人出院前,我都會評估病人/家長/照顧者是否準確地使用計量劑吸入器。 Before patient is discharged home, I shall assess patient/parent/carer if they use the MDI accurately.	1.	2.	3.	4.	5.
5. 我會要求病人/家長/照顧者示範如何使用計量劑吸入器或吸嘴輔助器。 I will ask patient/parent/carer to demonstrate how to use the MDI or spacer.	1.	2.	3.	4.	5.
6. 在教育講座後,我更有信心教育病人/家長/照顧者如何使用計量劑吸入器。 After the education talk, I am more confident in teaching patient/parent/carer in using MDI.	1.	2.	3.	4.	5.



RESULTS





Demographic data

Demographic data	Groups	N (%)
Gender	Male	0 (0)
	Female	38(100)
Ethnicity	Chinese	38(100)
	Black/white	0 (0)
Years of experience mean=1, maximum=32, mean(\pm SD)=9.71 \pm 9.138	0-10 years	27 (70.0)
	11-20 years	4 (10.5)
	Over 20 years	7 (18.4)

Table 1: Demographic data of the participants (n=38)



Validity - Content Validity Index

Items summary	CVI
All items (n=23)	0.939
Knowledge (n=4)	1.0
Attitude (n=10)	0.9
Practice (n=9)	0.925

Table2. Content validity index of the scale

*Scale developer of CVI use a criterion of 0.8 as the lower limit of acceptability for CVI.

Internal Consistency – Cronbach's Alpha

Items	N	Cronbach's alpha	
		Pretest	Posttest
All items	17	0.926	0.963
Knowledge	4	0.842	0.954
Attitude	7	0.769	0.930
Practice	6	0.917	0.920

Cronbach's alpha	Internal consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

Table 3. Cronbach's Alpha of the scale




Reliability- intraclass correction coefficient (ICC)

	N=17	Intraclass Correlation (95% Confidence Interval)
All items	17	0.755 (0.529-0.873)
Knowledge	4	0.833 (0.689-0.926)
Attitude	7	0.732 (0.557-0.858)
Practice	6	0.742 (0.578-0.879)

Less than 0.40—poor.
Between 0.40 and 0.59—Fair.
Between 0.60 and 0.74—Good.
Between 0.75 and 1.00—
Excellent.

Table 4. Intraclass Correlation (ICC) of the KAP instrument



Score on Pretest and Posttest

	Pretest n=38	Posttest n=38	p-value
	Mean (\pm SD)	Mean (\pm SD)	
All items (KAP)	72.26(\pm 4.12)	73.07(\pm 4.64)	0.025
Knowledge	16.73(\pm 1.62)	17.00(\pm 1.64)	0.038
Attitude	30.5(\pm 2.80)	30.7(\pm 3.14)	0.067
Practice	25.1(\pm 2.06)	25.78(\pm 2.56)	0.014
*Paired t-test			

Table 5. pre- and post-test measures on nurses' KAP in demonstrating and assessing metered-dose inhaler (MDI) plus whistle masks spacer technique

Discussion

✓ Validity

Content Validity Index

- 0.939 (overall)
- 0.9-1.0 (KAP)

✓ Internal consistency

Cronbach's Alpha

- 0.926-0.963 (overall-Pre & Posttest)
- 0.769-0.963 (KAP-Pre & Posttest)

✓ Reliability

intraclass correction coefficient

- 0.755 (overall)
- 0.732-0.833 (KAP)

Discussion

- Ⓢ **PLAY** was essential to all children, combining play and technology in medical device will enhance the compliance of inhalation technique.
- Ⓢ Nurses played an important role in patient education in both patients and carer
- Ⓢ While some health professionals may also unfamiliar with the technique
- Ⓢ hope that the use of whistle mask spacer would improve the competence of nurses in patient education.
- Ⓢ development and validation of the Chinese version on measuring nurses' competency scale is essential before the implementation of the app and mask



Implications for paediatric nursing practice

Provide training and education on the MDI plus whistle mask spacer to nurses

improve the paediatric nurses' competency in proper demonstration of technique

help to assess patients' technique accurately

indirectly reduced children and their parents' stress and anxiety

improve the quality of care in nursing



Limitation



control group was not available



lack of random assignment

Selection bias



Sample size was limited



Samples were recruited in one hospital only

Sampling bias



100% participants were female

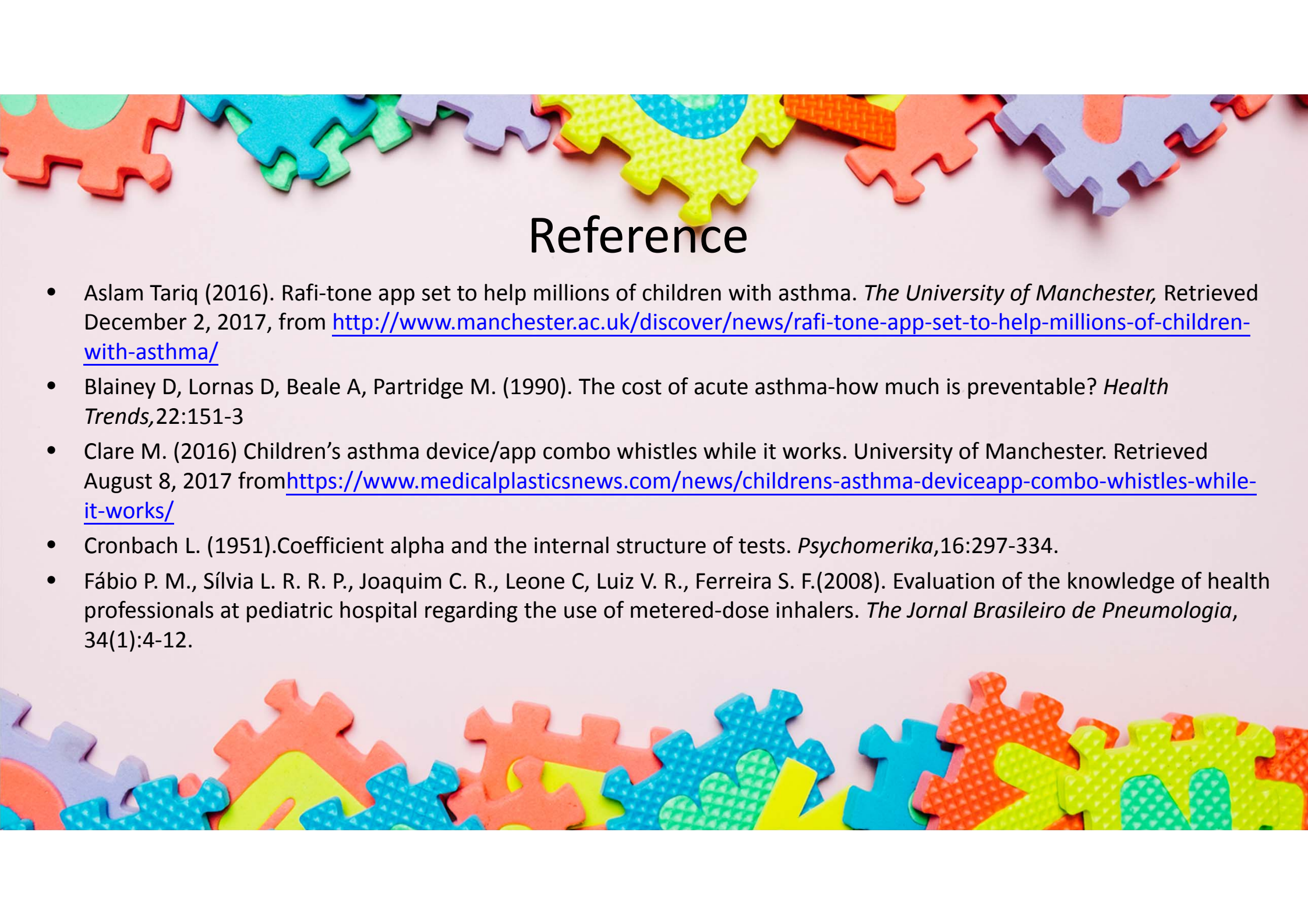


Conclusion

- © the newly developed scale on measuring paediatric nurses' competency in demonstrating and assessing MDI plus whistle mask spacer technique was appropriate to use in the Chinese society. Although there were limitations in this study, the result was promising.

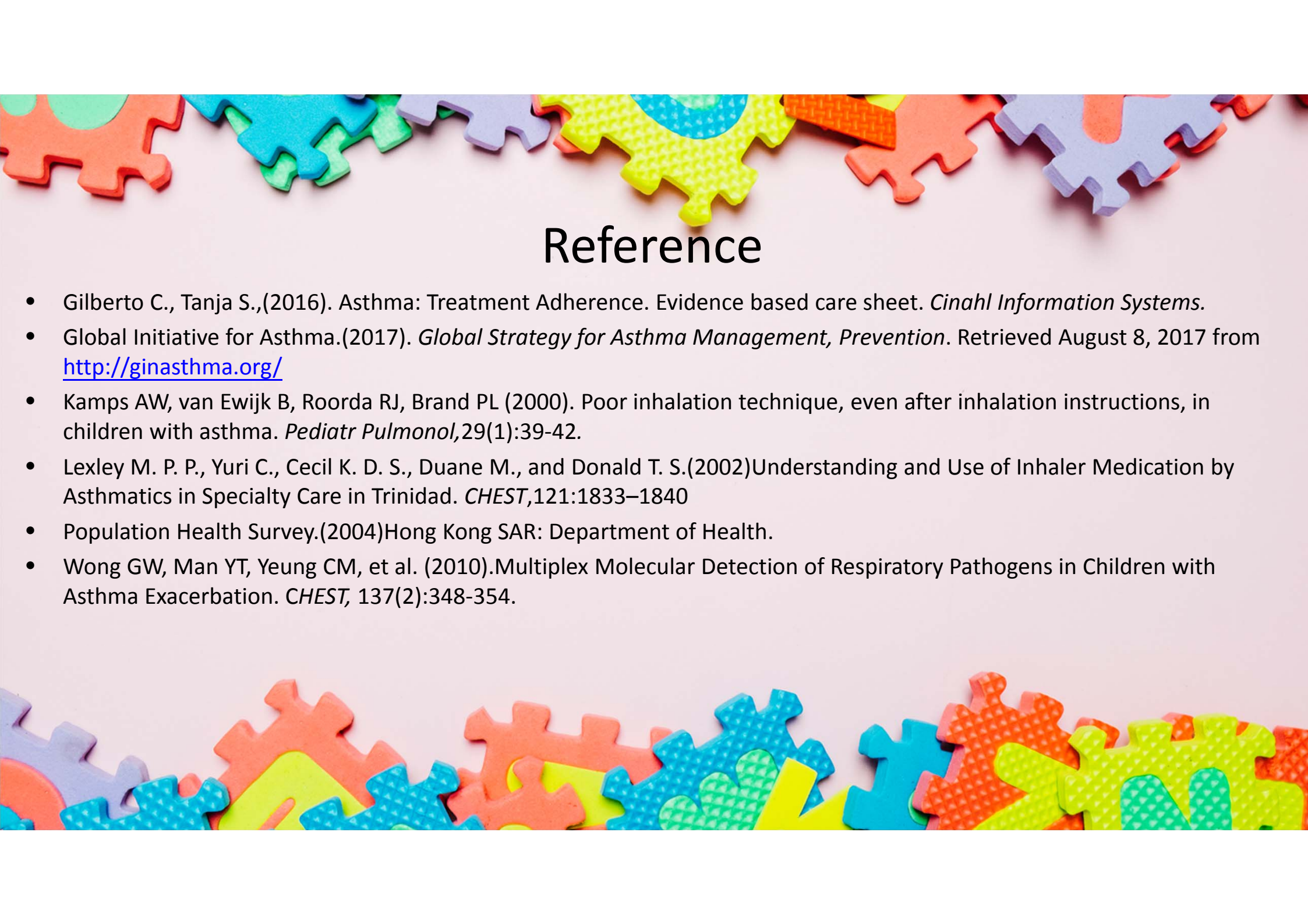
Thank You





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