Written Asthma Action Plan in Emergency Department Improves Knowledge and Asthma Control among Adult Acute Asthma Patients

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ABSTRAK

Pengurusan kendiri asma menggunakan pelan tindakan asma secara bertulis (WAAP) penting dalam memastikan pengurusan asma yang berkesan kerana ia mengurangkan kadar kehadiran ke hospital. Kajian ini menilai peningkatan pengetahuan dan kawalan asma menggunakan WAAP di kalangan pesakit asma di Jabatan Kecemasan. Kajian cubaan kawalan rawak ini dijalankan selama 19 bulan di Jabatan Perubatan Kecemasan sebuah hospital universiti. Kajian ini melibatkan pesakit dewasa serangan asma ringan dan sederhana. Pesakit dibahagikan secara rawak kepada dua kumpulan iaitu kumpulan intervensi dan kawalan. Soal selidik pengetahuan penyakit asma diberikan pada pesakit. Pesakit dari kedua kumpulan menerima kaunseling tentang penyakit asma berdasarkan risalah asma yang telah disediakan. Kumpulan intervensi, kemudiannya menerima kaunseling WAAP mengikut keperluan individu tersebut. Kumpulan kawalan menerima kaunseling lisan berdasarkan perawatan. Susulan kajian dijalankan pada 1 dan 3 bulan. Pengetahuan penyakit asma dan kawalan penyakit asma dinilai melalui tinjauan telefon. Lima puluh pesakit telah dibahagikan secara rawak kepada kumpulan intervensi dan kawalan. Setiap kumpulan menerima 25 pesakit. Skor pengetahuan kumpulan intervensi jauh lebih tinggi daripada kawalan (16.88±0.44 vs 13.36±3.72; p<0.001). Kumpulan intervensi mencapai kawalan asma yang baik (skor ACT >19) pada 1 bulan berbanding kumpulan kawalan (20.64±3.26 vs 17.72±4.17). Kedua-dua kumpulan mencapai kawalan yang baik pada 3 bulan. Pengurusan kendiri asma dengan menggunakan WAAP di Jabatan Kecemasan meningkatkan pengetahuan dan kawalan asma di kalangan pesakit yang mendapat serangan asma ringan dan sederhana.

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ABSTRACT

Self-management of asthma using the written asthma action plan (WAAP) is important in ensuring effective management of asthma as it reduces hospital visits. This study evaluates the improvement in knowledge and asthma control using WAAP among adult patients with acute asthma presenting to Emergency Department (ED). This randomized control trial was conducted over a 19-month period in an ED of a university hospital. Adult patients with acute mild to moderate asthma were included in the study. Patients were randomized into intervention and control group. A self-administered knowledge questionnaire was distributed to all patients. Both groups received asthma counselling guided by asthma flyers. The intervention group was further counselled on individualized WAAP. The control group received standard verbal advice upon discharge. Subsequently at 1 month and 3 months a follow up was conducted. Knowledge and asthma control were assessed via a telephone survey. Fifty patients were assigned randomly to intervention (WAAP) and control group. Each group received 25 patients. The knowledge score of the intervention group was significantly more than the control group (16.88 ± 0.44 vs 13.36 ± 3.72; $p<0.001$). The intervention group achieved good asthma control (ACT score >19) at 1 month compared to control group (20.64 ± 3.26 vs 17.72 ± 4.17). Both groups achieved good control at 3 months follow up. Self-management with WAAP in ED improves knowledge and asthma control among acute mild to moderate asthma patients.

Keywords: asthma, adult, education, emergency department, prevention

INTRODUCTION

Asthma is a serious global disease affecting an estimated 339 millions of individuals worldwide (Global asthma network 2018). It causes a burden on the healthcare system, reduction in life quality and a cause of premature death. Poor asthma control among patients caused frequent emergency department visits and hospitalization (Adams et al. 2000). Among the main goal of good asthma control is reducing the use of Emergency Department (ED) for acute asthma treatment. Continuous education with adherence to medications and follow up are important element in managing asthma effectively. Apart from that, self-management with a guided written asthma action plan (WAAP) improves asthma control with fewer asthma attacks, ED visits, fewer days off work and reduce reliever medication used (Gibson et al. 2003). WAAP is an individualized tool for patients to recognize their acute asthma symptoms. It is a self-management tool

for patients to recognize acute asthma symptoms, worsening asthma control and applied treatment accordingly as planned with the health care providers. Components of WAAP are strategies to increase treatment based on symptoms or peak expiratory flow (PEF), durations to increase treatment and the warnings symptoms to be aware of to seek immediate help (Cross et al. 2014).

Self-management with WAAP has been recommended by worldwide asthma guideline including the Malaysian Clinical Practice Guideline (CPG) (Omar et al. 2017). However, despite its usefulness, the use of WAAP remains poor (Ring et al. 2015). Lack of awareness among primary health care providers as well as patients may lead to increase in emergency department visits.

The objective of this study was to evaluate the knowledge and asthma control using WAAP in comparison to standard counselling among patients with mild to moderate acute asthma presenting to ED.

MATERIALS AND METHODS

We conducted a randomized control trial on all adult patients who were treated for mild to moderate asthma and discharge home from the ED of tertiary teaching hospital from 1st May 2017 to 31st December 2018. This study was ethically approved by institutional Research Ethics Committee (Code no FF-2018-017). Patients with diagnosis of severe asthma, life-threatening asthma, pregnant and hospitalized were excluded.

Study Protocols

Patients were randomized into intervention (WAAP) and control group using computer randomization software. All patients were treated according to the standard acute asthma management by a treating doctor prior to discharge. A self-administered knowledge questionnaire was distributed to all patients prior to counselling and discharge. Following the completion of the knowledge questionnaire, the intervention group received counselling using an asthma flyer and an individualized WAAP was discussed by the researcher. The control group also received counselling using an asthma flyer and verbal advices upon discharge as per local standard guideline. Subsequently a follow-up telephone survey was conducted at 1 month and 3 months after discharged. During the telephone survey, knowledge was assessed and asthma control was reviewed using an Asthma Control Test (ACT) score. Data collected were analyzed for descriptive analysis using SPSS version 21.

Study Tools

The study tools for this research were the asthma knowledge questionnaire, the ACT scorecard, asthma flyer and the written asthma action plan. The knowledge questionnaire consists of 30 multiple choice questions on asthma symptoms, asthma control and current treatment. It was bilingual in Malay and English. The questionnaire was developed by the researcher and its content was validated by an

Table 1: Knowledge score at pre-intervention, 1 month and 3 months

	WAAP (n=25) Mean ± SD	Control (n=25) Mean ± SD	p-value
Pre-Intervention	13.52 ± 2.69	13.00 ± 3.75	0.868
1 Month	16.88 ± 0.44	13.36 ± 3.72	<0.001*
3 Month	17.00 ± 0.00	17.00 ± 0.00	1.000
* Kruskal wallis test (p<0.001 is significant)			

emergency physician. A face validation was conducted prior to the study. Each question carries one mark.

The ACT score is a set of 5 questions to assessed asthma control (Schatz et al. 2006). ACT score of 20-25 is good control, 15-19 is poorly controlled and 5-14 is not controlled. Asthma Flyer was developed by the researcher contained an information on 4 general steps of managing acute asthma.

The WAAP used in the study was modified and adapt from International and National Asthma Guidelines (Omar 2017). It consists of acute asthma symptoms, triggering factors, discharge medications and corresponding treatment strategies based on current asthma status. Current asthma status is divided into 3 categories which are doing well (green), getting worse (yellow) and alert (red). Each category is provided with a treatment plan.

RESULTS

Seventy patients were enrolled in the study. A total of 50 patients completed the 19 months study. Both groups were equally distributed. Majority of patients had good education level, non-smoker and had childhood asthma.

There was a significant difference in knowledge score between intervention (WAAP) group and control group after one month (Table 1). However, there was no difference in knowledge at 3 months between the group as both groups had a mean score of 17.

The intervention (WAAP) group achieved good asthma control at 1 month (ACT score >19) as compared to the control group. At 3 months both groups achieved good asthma control (Table 2).

Table 3 showed the comparison of the ACT score within the group at pre-intervention and 1 month; 1 month and 3 months. Both groups showed significant improvement of asthma control. However, intervention

Table 2: ACT score at pre intervention, 1 month and 3 months

	WAAP (n=25) Mean ± SD	Control (n=25) Mean ± SD	p-value
Pre-Intervention	16.44 ± 5.28	14.84 ± 5.14	0.293
1 Month	20.64 ± 3.26	17.72 ± 4.17	0.016*
3 Month	23.12 ± 2.52	21.28 ± 2.56	0.006*
* Kruskal wallis test (p<0.001 is significant)			

Table 3: Comparison on ACT score in WAAP and Control at pre intervention, 1 month and 3 months

	WAAP Mean ± SD	Z	p-value	Control (Mean ± SD)	Z	p-value
Pre	16.44 ± 5.28	-3.925	<0.000*	14.84 ± 5.14	-3.614	<0.000*
1 Month	20.64 ± 3.26			17.72 ± 4.17		
1 Month	20.64 ± 3.26	-3.421	0.001*	17.72 ± 4.17	-4.208	<0.000*
3 Month	23.12 ± 2.52			21.28 ± 2.56		
* Wilcoxon signed rank test (p<0.001 is significant)						

(WAAP) group was able to achieve a significant good control earlier i.e. at 1 month as compared to control group.

Table 4 showed comparison of the knowledge score within the group at pre intervention, 1 month and 3 months. There was a significant knowledge score improvement within the intervention (WAAP) group at 1 month as compared to the control group. However, both groups achieved a similar score at 3 months.

DISCUSSION

The long-term goals of asthma management are to reduce exacerbations with good control of symptoms, as well as reducing asthma-related death (Global Initiative For Asthma 2019). A self-guided management of asthma has been shown to improves clinical outcomes, hence it is recommended unambiguously by asthma guidelines (Global Initiative For Asthma 2019). This includes self-monitoring of symptoms, a WAAP and regular review of asthma control by health care providers. A WAAP is a personalised action plan educating patients on making immediate changes to their treatment in response to asthma symptoms or individual Peak Expiratory Flow (PEF) changes. Despite high-quality evidence supporting it, the use of WAAP remains low in asthma patients presenting to ED with acute exacerbations (Gibson et al. 2004).

Our study revealed that there was significant improvement in the knowledge and ACT score in the intervention (WAAP) group at 1 month compared to the control group who received standard counselling

Table 4: Comparison on knowledge score in WAAP and Control at pre intervention, 1 month and 3 months

	WAAP Mean ± SD	Z	p-value	Control (Mean ± SD)	Z	p-value
Pre	13.52 ± 2.69	-4.125	<0.000*	13.00 ± 3.75	-3.20	0.749
1 Month	16.88 ± 0.44			13.36 ± 3.72		
1 Month	16.88 ± 0.44	-1.342	0.180	13.36 ± 3.72	-3.737	<0.000*
3 Month	17.00 ± 0.00			17.00 ± 0.00		
* Wilcoxon signed rank test (p<0.001 is significant)						

prior to discharge. There was also retention of knowledge at 3 months in the intervention (WAAP) group. This findings demonstrated the counselling session based on the WAAP was beneficial in improving the patient's knowledge of acute asthma management. The WAAP-based counselling provide clear communication and instruction to the patient. Key issues were discussed and treatment were individualised for each patient. Effective partnership between patient and health care providers is an important element in managing asthma successfully.

Previous studies showed that patients with better knowledge of asthma had better asthma control (Nguyen et al. 2018). Our study revealed that patient who were in the intervention (WAAP) group had significantly better ACT score at 1 month and 3 months compared to the control group. This correlates to the knowledge. This group of patients had a better knowledge as well as ACT scores. Patients with ACT score of less than 19 had poor asthma control (Schatz et al. 2006). The WAAP group achieved a mean ACT score of more than 19 at one month compared to the control group who had an ACT score of less than 19 at one month. Both groups achieved the mean ACT score more than 19 at 3 months. The improvement in the control group may be due to reinforcement of asthma control that may be communicated during the one month follow up.

Adjustment of medications to improve asthma control may be optimised by either a self-adjustment using WAAP or by regular medical review. Previous studies showed no difference between the two methods in improving asthma outcome (Powell & Gibson 2003). As seen in our study both groups showed significant improvement of ACT score at pre-intervention, one month and 3 months. However, in Malaysia follow up rate of asthma patients in clinics and hospitals were only 32.6% with exacerbation rate of 68.1% (Institute for Public Health 2008). Therefore, a self-adjustment using WAAP is beneficial in optimizing their asthma control.

It is the recommendation by clinical practice guideline for all asthma patients to be offered a self-management education preferably a WAAP (Omar et al. 2017). Although ED is a high-volume area with high turnover of patients, WAAP should be initiated and review by primary healthcare physician or respiratory physician. Educational interventions initiated in ED had been shown to reduce subsequent asthma related hospital admission (Tapp et al. 2007).

The most important limitation in this study is the small non-variable demographic sample size obtained. This study was conducted in only one university hospital which does not represent the whole Malaysian population of asthma patients.

Retention of knowledge and control of asthma should be further tested and follow up in 6 months and one year. This is important to detect the on asthma-related outcome such as hospital admissions or emergency reattendance.

Future studies can focus on the asthma-related outcomes such as

hospital admission and representation in ED or primary clinic. Larger sample size will provide more meaningful statistical result. Furthermore training, knowledge and willingness to provide asthma counselling and WAAP among primary health care providers should further be explored in future studies as it would provide additional information in asthma management in Malaysia.

CONCLUSION

In conclusion, counselling using WAAP may be helpful in ED setting to improve patient's knowledge and asthma control. This study may be one of the earliest randomized control studies in Malaysia to explore the use of self-management in ED. The results were encouraging and support the evidence to use self-management education in ED in Malaysia. Implementing WAAP in ED may provide a better asthma control in asthma patients.

REFERENCES

Adams, R.J., Smith, B.J., Ruffin, R.E. 2000. Factors associated with hospital admissions and repeat emergency department visits for adults with asthma. *Thorax* **55**(7): 566-73.

Cross, E., Villa -Roel, C., Majumdar, S.R., Mohit, B., Rosychuk, R., Couperthwaite, S., Rowe, B.H. 2014. Action plans in patients presenting to emergency departments with asthma exacerbations: frequency of use and description of contents. *Canadian Respiratory Journal* **21**(6): 351-6.

Gibson, P.G., Powell, H. 2004. Written action plans for asthma: an evidence-based review of the key components. *Thorax* **59**(2): 94-9.

Gibson, P.G., Powell, H., Wilson, A.J. 2003. Self-management education and regular practitioner review for adults with asthma. *Cochrane Database Syst Rev* **1**: CD001117

Global Initiative For Asthma. 2019. Global Strategy for Asthma Management and Prevention: Updated 2019. https://ginasthma.org/wp-content/uploads/2019/06/GINA-2019-main-report-June-2019-wms.pdf. [20 January 2020].

Global asthma network. 2018. Global Asthma Report 2018. http://www.globalasthmanetwork.org/Global%20Asthma%20Report%202018.pdf. [20 January 2020].

Institute for Public Health (IPH). 2008. The Third National Health and Morbidity Survey 2006 Vol. II. Kuala Lumpur. http://iku.moh.gov.my/nhms [20th January 2020].

Nguyen, V.N., Huynh, T.H., Chavannes, N.H. 2018. Knowledge on self-management and levels of asthma control among adult patients in Ho Chi Minh City, Vietnam. *International Journal of General Medicine* **11**: 81-9.

Omar, A., Yin, C.L., Lockman, H., Zainol Abidin, I.Z., Hyder, A.I., Ramadoo, J.M., Md Yasin, M., Mohd. Yusof, M.A., Mohd Zin, M.A., Mohd Isa, N.A., Md Jamal, S., Kin, Y.C. 2017. Clinical Practice Guidelines. Management of Asthma in Adults. Malaysian Health Technology Assessment Section. Putrajaya https://www.moh.gov.my/index.php/pages/view/135?mid=67 [20th January 2020].

Powell, H., Gibson, P.G. 2003. Options for self-management education for adults with asthma. *Cochrane Database Syst Rev* **1**: CD004107

Ring, N., Booth, H., Wilson, C., Hoskins, G., Pinnock, H., Sheikh, A., Jepson, R. 2015. The 'vicious cycle' of personalised asthma action plan implementation in primary care: a qualitative study of patients and health professionals' views. *BMC Family Practice* **16**: 145.

Schatz, M., Sorkness, C.A., Li, J.T., Marcus, P., Murray, J.J., Nathan, R.A., Kosinski, M., Pendergraft, T.B., Jhingran, P. 2006. Asthma Control Test: Reliability, validity, and responsiveness in patients not previously followed by asthma specialists. *J Allergy Clin Immunol* **117**(3): 549-56.

Tapp, S., Lasserson, T.J., Rowe, B.H. 2007. Education interventions for adults who attend the emergency room for acute asthma. *Cochrane Database Syst Rev* **3**: CD003000.