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Chronic disease management in Emergency Department patients presenting with dyspnoea.

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Abstract

Introduction: Guideline recommended treatments for chronic conditions are thought to reduce ED presentations.

Method: We used data from 1958 ED patients with dyspnoea to describe medication use in people with chronic conditions.

Results: 1233 (63.5%) patients had one or more of: COPD 547 (28%); asthma 454 (23%); AF 368 (19%) or HF 401 (21%). Approximately 70% were prescribed appropriate preventative medication for their chronic condition when they presented to ED with dyspnoea.

Conclusion: Prescription of guideline recommended therapies for chronic conditions in patients presenting to the ED in Australasia with acute dyspnoea is similar or higher than reported previously.

Key Words

Emergencies

Chronic Disease

Drug Therapy

Preventative Medicine

Dyspnoea

Introduction

Clinical practice guidelines inform therapeutic decision-making for management of chronic medical conditions including chronic obstructive pulmonary disease (COPD), asthma, atrial fibrillation (AF) and heart failure (supplementary file). These guidelines aim to promote uptake of evidence-based

practice to optimise patient care and improve quality of life, reduce emergency department (ED) attendances and reduce hospital admissions.

There is limited data regarding medication use in patients with these chronic conditions presenting to the ED. Data from our large study of patients attending ED with dyspnoea as a main symptom[1] afforded us the opportunity to explore chronic medication use in the sub-group of that population with the defined chronic conditions. The aim of this study was to describe routine medication use in patients presenting to ED with dyspnoea with COPD, asthma, AF or HF.

Methods

This was a sub-study of a prospective, international cohort study undertaken in 2014, with methods previously reported.[1] Ethics approvals were obtained for all sites according to local requirements.

Outcomes of interest and analysis

The primary outcome was the proportion of patients receiving guideline recommended preventative pharmacotherapy. The secondary outcome was the reason for presentation to ED. The analysis was descriptive, using SPSS v25, IBM corporation, Armonk, NY, USA

Results

The table shows the demographics, co-morbidities, medication use and reason for ED presentation. The mean (95%CI) age was 65 (64-66) years and 54% (52-56%) were female. Co-morbidities were common, with 1233/1958 (63.5%) having more than one chronic condition. Appropriate preventative treatments were prescribed for 400/547 (73%) COPD, 273/454 (60%) asthma, 270/368 (73%) AF and 372/401 (93%) HF patients. The full list of medications for each group is shown in the supplementary file. Approximately half of the time, people with a known chronic condition presented with an exacerbation of that condition. The other reasons for presentation with acute shortness of breath in this cohort were mostly due to an exacerbation of one of the other chronic

conditions studied, or respiratory tract infections (20%), as shown in the table. Other causes of shortness of breath were uncommon. These included acute coronary syndromes (49), pulmonary embolism (33), anaemia (28), interstitial/other chronic lung disease (19), malignancy (19), non-respiratory sepsis (17), pneumothorax (14), allergy (14), and drugs/toxins (10).

Discussion

Compliance with guideline recommended therapy for chronic conditions for patients presenting to the ED in Australasia with acute shortness of breath was similar or higher in 2014 than that reported previously. Three quarters of patients with COPD were on preventative treatment, at the high end of rates reported in other studies (supplementary file). Three quarters of patients with a history of AF were on rate control medication. Although lower than rates from an AF registry study in Korea,[2] this is not unexpected given our cohort was an unselected group of AF patients. Two thirds of AF patient were on stroke prevention medications, which is higher than previously reported. Almost all HF patients were on treatment, which is higher than previously reported rates (supplementary file)

Provider adherence to guidelines improves when providers are aware of the guideline and believe it applies to their patients.[3] Adherence is also improved when the guideline is clear, supported by management, implementation is resourced appropriately, feedback is given, and that there is teamwork and a commitment to quality improvement.[3]

Patient compliance with medication is complex. In some but not all settings, beliefs about health, treatments, cultural influences, patient-prescriber relationships, and perceptions of illness control were important.[4]

A systematic review of cost effectiveness studies across many chronic conditions found few studies and inconsistent evidence for the cost effectiveness of interventions to improve COPD/Asthma and HF compliance.[5]

Although the current study suggests there may be some room for improvement in compliance for patients with chronic disease presenting to the ED with dyspnoea, it is unclear whether interventions would be beneficial or cost effective in this cohort of patients with respect to reducing subsequent ED presentations. Further research is recommended to determine whether this is the case and what role ED may have in this regard.

Limitations

As a retrospective study we were not able to confirm that patients were compliant with treatments prescribed, and the true compliance with long term medications may be lower than the prescription rate reported here. Our findings only relate to the cohort and time studied, so may not represent compliance in the wider community.

Conclusion

Our study found that prescriptions for guideline recommended therapy for chronic conditions for patients presenting to the ED in Australasia with acute shortness of breath was similar or higher in 2014 than reported previously.

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AANZDEM study group:

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Author contributions: PJ design, recruitment analysis, manuscript preparation and revision; AMK concept, design, recruitment, analysis, manuscript preparation; AH, GK, CAG, SC, WSK, SL design, recruitment, refinement of manuscript, SK design, data management, refinement of manuscript.

Conflict of interest: GK, SC and PJ are section editors for Emergency Medicine Australasia. AMK is a member of the Editorial Board of Emergency Medicine Australasia.

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Table: Demographics, Co-morbidities, Medications and Reason for ED Presentation

	COPD	Asthma	Atrial Fibrillation	Heart Failure
	n=547	n=454	n=368	n=401
Demographics				
Age (median, IQR)	75, 65-82	57, 38-73	81, 70-87	80, 69-88
Sex (N male, %, 95% CI)	298, 54%, 50-59%	159, 35%, 31-46%	193, 52%, 47-58%	206, 51%, 46-56%
Co-morbidities (N, %, 95% CI)				
Hypertension	310, 57%, 52-61%	170, 37%, 33-42%	239, 65%, 60-70%	261, 65%, 60-70%
Ischaemic heart disease	194, 35%, 31-40%	77, 17%, 14-21%	145, 39%, 35-44%	206, 51%, 46-56%
Dyslipidaemia	210, 38%, 34-43%	104, 23%, 19-27%	167, 45%, 40-50%	183, 46%, 41-51%
Diabetes	138, 25%, 22-29%	88, 19%, 16-23%	111, 30%, 27-35%	162, 40%, 36-45%
Smoker (Active/Recent)	120, 22%, 19-26%	89, 20% 16-24%	32, 9%, 6-12%	39, 10%, 7-13%
Heart Failure	164, 30%, 26-34%	56, 12%, 9-15%	179, 49%, 44-54%	-
Atrial Fibrillation	118, 21%, 18-25%	45, 10%, 7-13%	-	179, 45%, 40-50%
Chronic Obstructive Pulmonary Disease	-	86, 19%, 16-23%	118, 32%, 28-37%	164, 41%, 36-46%
Asthma	86, 16%, 13-19%	-	45, 12%, 9-16%	56, 14%, 11-18%
Prescribed Medications (N, %, 95% CI)				
Any Heart Failure Medication	384, 70%, 66-74%	186, 41%, 37-46%	323, 88%, 84-91%	**372, 93%, 90-95%**
Any Rate Control Medication	249, 45%, 41-50%	113, 25%, 21-29%	**270, 73%, 68-78%**	270, 67%, 63-72%
Long-acting anticoagulant	97, 18%, 15-21%	47, 11%, 8-14%	**199, 54%, 49-59%**	128, 32%, 28-37%
Any Respiratory Preventer	**452, 83%, 79-86%**	**368, 81%, 77-84%**	160, 43%, 39-49%	187, 47%, 42-52%
*Respiratory Preventer (excluding B-agonist)**	***400, 73%, 69-77%***	***273, 60%, 56-65%***	*141, 38%, 33-43%*	*156, 39%, 34-44%*
Primary Diagnoses for ED Presentation (N, %, 95% CI)				
COPD acute exacerbation	**274, 50%, 46-54%**	52, 12%, 9-15%	49, 13%, 10-17%	66, 16%, 13-20%
Asthma acute exacerbation	12, 2%, 1-4%	**190, 42%, 37-46**	9, 2%1-5%	8, 2%, 1-4%
Atrial fibrillation	7, 1%, 0-3%	7, 1%, 0-3%	**22, 6%, 4-9%**	8, 2%, 1-4%
Heart failure acute exacerbation	75, 14%, 11-17%	34, 7%, 5-10%	144, 39% 34-44%	**188, 47%, 42-52%**
Respiratory Infection	100, 18%, 15-22%	102, 22%, 19-27%	76, 21%, 17-25%	65, 16%, 13-20%
Other	79, 14%, 12-18%	69, 15%, 12-19%	68, 18%, 15-23%	66, 16%, 13-20%

Key: *It was not known if the beta-agonist was short or long acting **some patients on dual antiplatelet agents. **Bold** font indicates treatment appropriate for the particular chronic condition or presentation due to the chronic condition as appropriate. ED=Emergency Department , COPD=Chronic Obstructive Pulmonary Disease

Supplementary File

Supplementary Table 1: Medication use in Patients with Chronic Conditions

	COPD	Asthma	Atrial Fibrillation	Heart Failure
	n=547	n=454	n=368	n=401
Chronic medications (N, %, 95% CI)				
Any Heart Failure Medication	384, 70%, 66-74%	186, 41%, 37-46%	323, 88%, 84-91%	**372, 93%, 90-95%**
Any Rate Control Medication	249, 45%, 41-50%	113, 25%, 21-29%	**270, 73%, 68-78%**	270, 67%, 63-72%
Long-acting anticoagulant	97, 18%, 15-21%	47, 11%, 8-14%	**199, 54%, 49-59%**	128, 32%, 28-37%
Any Respiratory Preventer	**452, 83%, 79-86%**	**368, 81%, 77-84%**	160, 43%, 39-49%	187, 47%, 42-52%
*Respiratory Preventer (excluding B-agonist)**	***400, 73%, 69-77%***	***273, 60%, 56-65%***	*141, 38%, 33-43%*	*156, 39%, 34-44%*
Specific Medications				
Diuretic	211, 39%, 35-43%	90, 20%, 16-24%	211, 57%, 52-62%	**300, 75%, 79-79%**
Nitrates	65, 12%, 10-15%	24, 6%, 4-8%	47, 13%, 10-17%	**73, 18%, 15-22%**
Beta blocker	149, 27%, 24-31%	60, 13%, 10-17%	**173, 47%, 42-52%**	**219, 55%, 56-60%**
Cardiac glycoside	53, 10%, 7-13%	12, 3%, 1-5%	**95, 26%, 22-31%**	**57, 14% 11-18%**
ACE inhibitor	224, 41%, 37-45%	124, 27%, 23-32%	175, 48%, 43-53%	**212, 53%, 48-58%**
Aldosterone antagonist	54, 10%, 8-13%	15, 3%, 2-5%	43, 12%, 9-15%	**66, 16%, 13-21%**
Calcium channel antagonist	109, 20%, 17-23%	61, 13%, 11-17%	**79, 21%, 18-26%**	73, 18%, 15-22%
Other anti-arrhythmic	38, 7%, 5-9%	9, 2%, 1-4%	**76, 21%, 17-25%**	60, 15%, 12-19%
Statin	247, 45%, 41-49%	114, 25%, 21-29%	190, 52%, 47-57%	205, 51%, 46-56%
Aspirin	190, 35%, 31-39%	72, 16%, 13-20%	**131, 36%, 34-41%**	165, 41%, 36-46%
Clopidogrel	77, 14%, 11-17%	29, 6%, 4-9%	**39, 11%, 8-14%**	64, 16%, 13-20%
Any antiplatelet agent**	227, 42%, 37-46%	97, 21%, 18-25%	**153, 42%, 37-47%**	196, 49%, 44-54%
Long-acting anticoagulant	97, 18%, 15-21%	47, 11%, 8-14%	**199, 54%, 49-59%**	128, 32%, 28-37%
Inhaled beta-agonist	**401, 73%, 69-77%**	**332, 73%, 69-77%**	123, 33%, 29-38%	151, 38%, 33-43%
Inhaled anticholinergic agent	**280, 51%, 47-55%**	**90, 20%, 16-24%**	62, 17%, 13-21%	78, 20%, 16-24%
Inhaled corticosteroid	**272, 50%, 45-54%**	**221, 49%, 44-53%**	97, 37%, 22-31%	108, 27%, 23-32%
Xanthine	**12, 2%, 1-4%**	**10, 2%, 1-4%**	4, 1%, 0-3%)	6, 2%, 0-3%
Leukotriene receptor antagonist	**7, 1%, 0-3%**	**6, 1%, 0-3%**	1, 0%, 0-2%	3, 1%, 0-3%
Oral corticosteroid	**88, 16%, 13-20%**	**63, 14%, 11-17%**	31, 8%, 6-12%	39, 10%, 7-13%
Home oxygen	**205, 51%, 46-56%**	**14, 3%, 2-5%**	17, 5%, 3-7%	39, 10%, 7-13%

Key: *It was not known if the beta-agonist was short or long acting **some patients on dual antiplatelet agents. **Bold** font indicates treatment appropriate for the particular chronic condition. COPD=Chronic Obstructive Pulmonary Disease

Supplementary Table 2: Previous rates of compliance with medications in chronic conditions and relevant references

Condition	Compliance	References (full reference in list below table)
COPD	53-78%	Aaron 2007; Khdour 2009; Dhamane 2016; Neugaard 2011; Yang 2012; Karner 2014 Alsaeedi 2002
Asthma	50-80%	Williams 2004; Souza-Machado 2010; Calverly 2004; Peytremann-Bridevaux 2015; Chauhan 2015; Gatheral 2017
AF	50-90%	Kim 2017; Obramiro 2018
Heart Failure	28-80%	Neugaard 2011; Fitzgerald 2011; Tsuyuki 2001; Unverzagt 2016; Faris 2012; Flather 2000; Ruppar 2016

Reference List

The reference list is provided below as journal restrictions for the Short Report section only allow five references in the published manuscript. Readers with an interest in the topic may find this extended reference list useful.

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