

REVIEW

INFLUENCE OF RURALITY WHEN ACCESSING EMERGENCY HEALTHCARE DURING EXACERBATION OF ASTHMA: A SCOPING REVIEW

Alannah Stoneley, Registered Paramedic; Bch (Hons)*¹; Judith Anderson, PhD¹; Clare Sutton, MSc¹

Author Affiliations: 1. School of Nursing, Paramedicine and Healthcare Sciences, Charles Sturt University, Bathurst, NSW, Australia.

*Corresponding Author: alannah2910@hotmail.com

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ABSTRACT

Background: Asthma is a significant contributor of respiratory illness throughout Australia, taking a toll on all genders and age groups. The rural healthcare workforce is currently undersupplied, and this worsens with the degree of rurality posing disadvantages in healthcare access. Lower asthma-related mortality rates in metropolitan cities than other areas of Australia indicate a need to explore the extent of the impact that residing rurally has on access to emergency healthcare for asthma-related emergencies.

Methods: A scoping review of literature was conducted utilising the steps articulated in Peters et al. (2020) methodological approach. The databases: Cumulative Index to Nursing and Allied Health Literature (CINAHL), Emcare, Medline and PubMed were searched using key words. After screening 20 articles were included.

Results: Four main themes emerged including the impact of access to resources; individual behaviours and attitudes; education and health literacy; and rural clinician adherence to guidelines.

Conclusion: Several challenges are associated with living in rural areas which may impact patients ability to access emergency healthcare during an asthma-related emergency. Further research is recommended to determine the extent to which these challenges influence access to emergency healthcare and explore strategies to break down these barriers to ensure equitable emergency healthcare.

INTRODUCTION

In Australia, asthma is a significant contributor to respiratory illness amongst all age groups and genders with 2.7 million people (11% of the population) affected (Australian Institute of Health and Welfare, 2020). There is a higher incidence in rural areas as 74.1% of asthmatics reside in regional and remote locations (Australian Institute of Health and Welfare, 2020). NSW Ministry of Health statistics (Figure 1) demonstrate there are fewer asthma-related deaths in metropolitan local health districts (LHDs) than regional LHDs per 100 000 of the population in these areas indicating there may be limitations to accessing emergency healthcare outside metropolitan LHDs (NSW Ministry of Health,

2021). Whilst there is no agreed universal definition of the term ‘rural’ Bennett et al. (2019) associates rural areas with having smaller populations and land size or a greater the distance which needs to be travelled to reached the closest metropolitan town. Worley and Champion (2020) argue Australia has an undersupplied healthcare workforce worsening with the degree of rurality placing residents of these areas at a disadvantage when accessing appropriate healthcare. Research into the extent that living in rural locations impacts patients access to emergency healthcare particularly during an asthma-related emergency is scarce with limited current Australian based research available on the topic. This review explores the differences in circumstances between people living in metropolitan and rural areas in accessing emergency healthcare from an international perspective during an asthma-related emergency demonstrating the need for further research to be conducted to fully understand the extent and reason for these discrepancies.

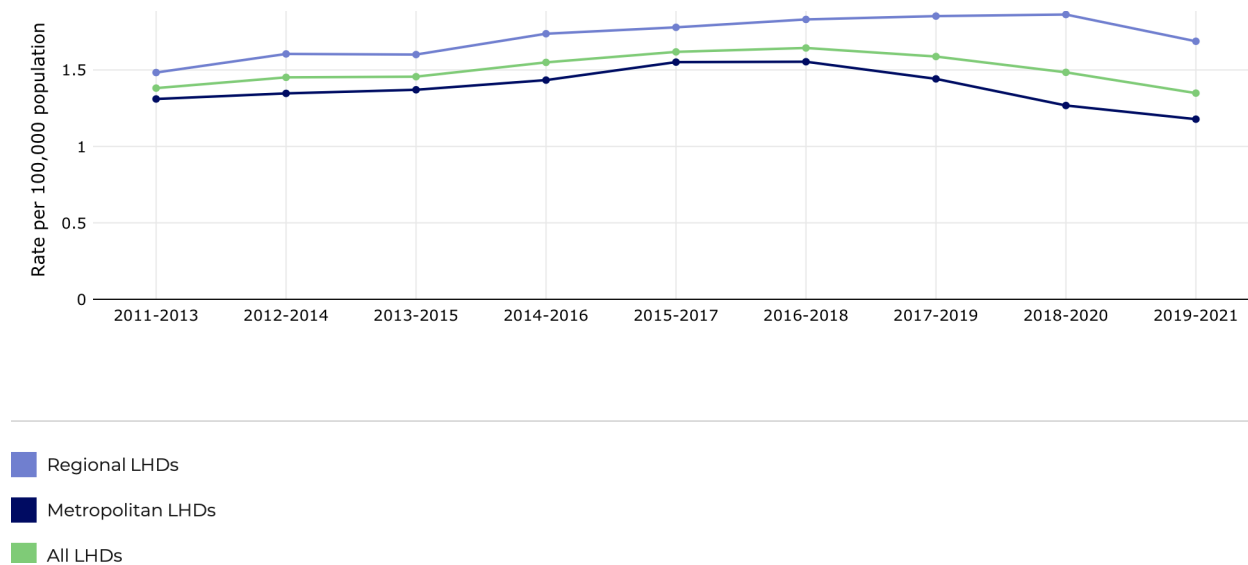


Figure 1: Asthma deaths in metropolitan LHDs compared to regional LHDs. (NSW Ministry of Health, 2021).

METHODS

The purpose of this review was to explore the influence of rurality when accessing emergency healthcare during an asthma-related emergency. To address the phenomena of interest, papers which focussed on people with asthma needing to access emergency healthcare in rural/remote/isolated areas were included. To gain a current perspective of this, papers which were older than 2005 were excluded from the search. This year was chosen based on age of literature and changing healthcare treatments over time. The main purpose of this review was to explore the how the element of rurality influences a difference in circumstances for rural asthmatics experience in accessing emergency healthcare for an asthma-related emergency. Additionally, other areas of interest included identifying any barriers causing resistance to accessing emergency healthcare during an asthma-related emergency. Sources which had minimal focus on asthma-related emergencies, or rural/remote/regional or isolated areas were excluded. As there was a limited amount of relevant literature published in Australia, the context of this study was extended to include international studies however, papers which were not written

in English were excluded. This review was inclusive of all genders and cultures. This scoping review included both qualitative and quantitative studies, however, grey literature was not included due to the possible risk of bias in documents which were not peer reviewed and author agreement that sources of this nature would not likely be of great significance in answering the review questions (Peters et al., 2020).

The search was registered through the OSF register (DOI 10.17605/OSF.IO/7RV3Y) and followed the steps articulated in Peters et al. (2020) methodological approach. This scoping review was carried out through a search of electronic databases including the Cumulative Index to Nursing and Allied Health Literature (CINAHL) Emcare, Medline and PubMed. Key words and synonyms were established, and truncations were applied to capture variations of key words and phrases. This search strategy and population, concept and context (PCC) was used to be more discriminating in selecting only relevant material (Peters et al., 2020). The search terms and an example of how this search was conducted using CINAHL can be seen in Table 1. Inclusion criteria were added to ensure the articles were relevant and related to the research question (Table 2). After the search, identified sources were uploaded into Endnote and duplicates were removed. Titles and abstracts were screened against the inclusion criteria with the full texts of selected sources assessed.

Search #	Search terms	Results
S1	asthma or asthma exacerbation or asthma attack or asthma related emergency	49, 179
S2	emergency department or emergency room or emergency healthcare or emergency medical services	139, 937
S3	paramedic or ems or emergency medical service or prehospital or pre-hospital or ambulance or emergency medical technician or emt	77, 927
S4	rural or remote or isolated or regional or small town	
	232, 021	
S5	S2 OR S3	57, 056
S6	S1 AND S4 AND S5	35

Table 1. Results from initial search of CINAHL.

PCC element	Inclusion Criteria	Exclusion Criteria
Population	Papers focused on patients who have needed to access emergency healthcare due to an asthma-related emergency.	Papers focused on patients who have not accessed emergency healthcare due to an asthma-related emergency.
Concept	To highlight any barriers for rural asthmatics access to emergency healthcare for an asthma-related emergency.	
Context	Papers which were included had a focus on rural, regional, or isolated environments. This context was extended to include international literature due to the limited amount of Australian based literature published on this topic.	Papers which were focused on metropolitan areas.

Table 2. PCC table (Joanna Briggs Institute, 2022).

Twenty sources were found to fit the criteria and publication ranged from 2005 to 2022. These sources were analysed to find key themes. The first author initially reviewed the articles to identify key themes. These were then further reviewed and discussed until agreement was reached between all authors. The data extracted can be seen in Table 3.

RESULTS

The results of the search and inclusion process can be found in Figure 2. 20 articles were selected following the full-text screening drawn from international studies as well as studies with an Australian focus. A summary of the major findings is provided in Table 3.

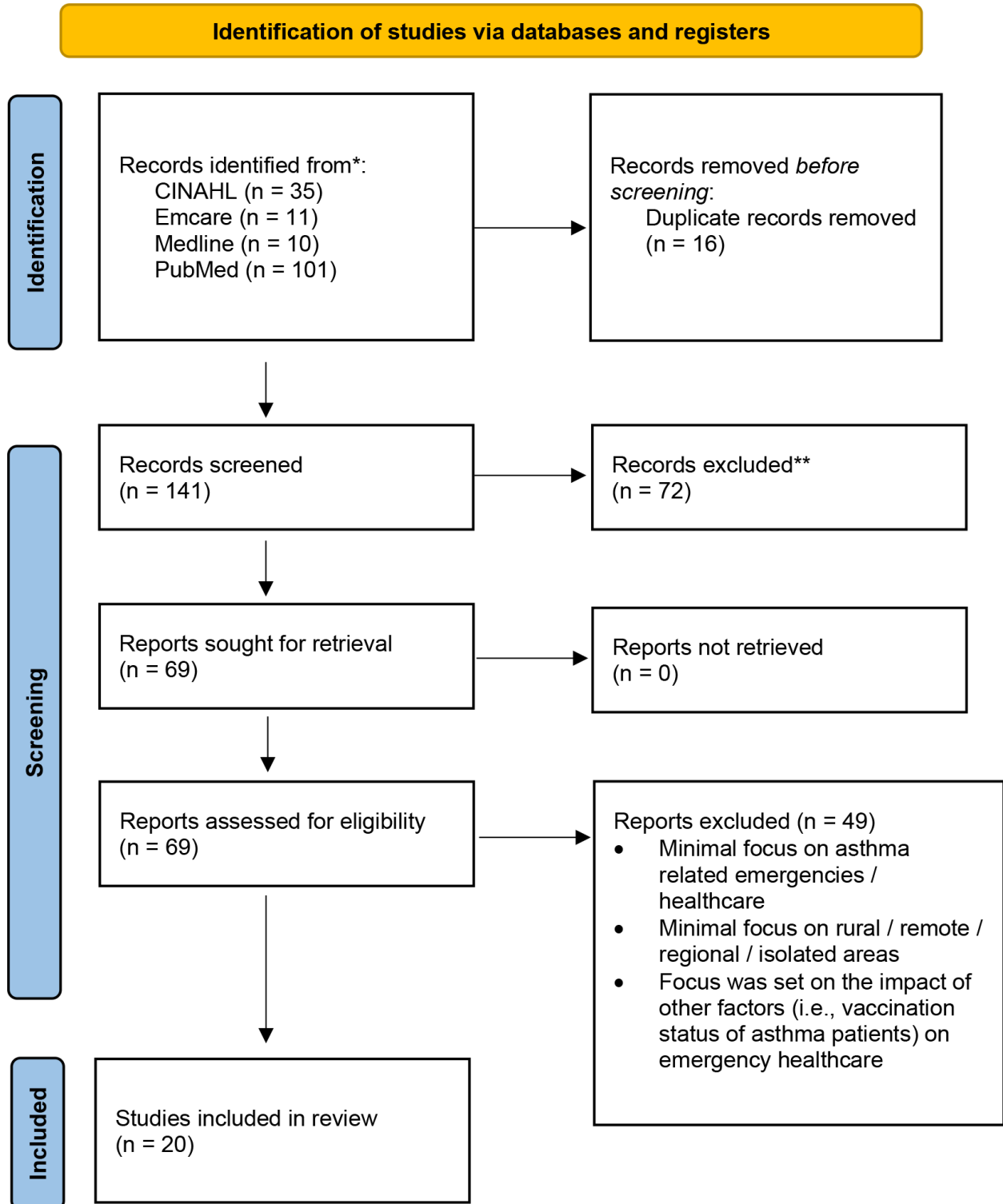


Figure 2: Prisma Diagram (Tricco et al., 2018).

Authors and year of publication	Location	Aim	Methods	Key findings
Fecho, Ahalt, Appold, Arunachalam, Pfaff, Stillwell, et al. (2022)	United States of America	Further develop and apply Integrated Clinical and Environmental Exposure Service (ICEES) as a tool to explore clinical and environmental data, focusing on asthma.	Queried the IECCS open application programming interface focusing on 2 primary outcomes associated with asthma exacerbations. Asthma cohort consisted of 157,410 patients.	Asthma patients residing in rural areas were more likely to have one or more hospital or emergency department visits than urban residents.
Pate, Zahran, Qin, Johnson, Hummelman, & Malilay (2021)	United states of America	Characterise asthma indicators and explore variations in emergency healthcare and asthma exacerbations by geographical area.	National health interview survey data analysis.	Rural residents typically have worse health outcomes and access to healthcare than urban areas. These residents also must travel longer distances and live in areas with hospital closures. emergency department visits for asthma were higher in urban areas however asthma mortality rates were higher in non-urban areas.
Juturu (2021)	United States of America.	Assess emergency healthcare access in the Salton Sea region of Imperial County.	Utilised the Rational Agent Access Model (RAAM) to assess travel times and access to emergency healthcare.	Average travel time to definitive care during an asthma exacerbation was 50-61 minutes. Imperial County had high asthma prevalence and a lack of resources to manage and treat complications of asthma.
Locke, Thomas, Woo, Nguyen, Tamanaha, Press, et al. (2019)	United States of America	Explore the impact of telehealth visits on inhaler technique and measure patient satisfaction.	Retrospective review of rural participants in a video telehealth inhaler training program.	Participants showed improved inhaler technique during the first session and 94% (n=74) participant satisfaction was recorded.
Fishe, Finlay, Palmer, & Hendry (2019)	United States of America	Describe the effects of regionalisation of paediatric inpatient asthma care on EMS operations for regional agencies.	State-wide cross-sectional EMS study.	Paediatric asthma care was concentrated in urban centres. This resulted in rural EMS crews having to travel long distances to admitting facilities for Florida's paediatric population experiencing asthma exacerbations.
Bian, Cristaldi, Summer, Su, Marsden, Mauldin, et al. (2019)	United States of America	Determine if there is an association between school-based telehealth programs and emergency department visits in South Carolina.	Analysis of South Carolina Medicaid claims from July 2018 – Feb 2019.	Nil associations were found between the program and emergency department visits however, the study concluded that telehealth with a focus on asthma may be beneficial to rural communities.
Braithwaite, Hibbert, Jaffe, White, Cowell, Harris, et al. (2018)	Australia	Establish the quality of healthcare provided to Australian children in inpatient and ambulatory care settings.	Multistage stratified sample with medical record review.	Showed an underutilisation of asthma management strategies specifically regarding written asthma plans.
Agusala, Vij, Agusala, Dasari, & Kola (2018)	United States of America	Explore the impact of asthma education in rural Texas.	Prospective study.	Asthma education was associated with reduced absences from school, and less frequent emergency department visits and hospitalisations. Education was also associated with better symptom management and confidence in understanding triggers and signs and symptoms.
Kew & Cates (2016)	United Kingdom	Assess the efficacy and safety of telemonitoring asthma at home.	Identified trials from the Cochrane airways review group.	No evidence suggested whether telemonitoring with feedback from a healthcare professional impacted the occurrence of exacerbations however, it suggested this approach may help to resolve some inequalities in healthcare associated with residing rurally.
Shaw & Siriwardena (2016)	United Kingdom	Explore attitudes of paramedics about the management of asthma prehospitally.	3 focus groups interviews.	Little research has been conducted into ambulance clinician's adherence to national asthma guidelines.
Kassean & Poordil (2011)	Mauritius	Determine 'rush hours' and identify trends of calls for the emergency medical assistance service of Mauritius (East Africa).	Evaluation research framework.	Asthma is one of the 3 most common reasons for patients to seek emergency healthcare in these regional areas. Further education was recommended for both staff (to keep up with demand) and for patients in these areas, along with improvement of emergency medical units to allow a better distribution in the regional locations.
Larson, Ward, Ross, Whyatt, Weatherston & Landau (2010)	Australia	Trial the outcomes of asthma patients when given an education session and asthma action plan.	Prospective cohort study.	Structured GP based education sessions were believed to be an effective preventative healthcare program having the potential to reduce unscheduled utilisation of health services.

Table 3. Literature review findings.

Authors and year of publication	Location	Aim	Methods	Key findings
Withy & Davis (2008)	United States of America	Investigate and compare the rates of follow up visits after emergency department visits for asthma exacerbations between rural and urban patients in Hawaii.	Retrospective review.	Patients who had a follow up visit after their initial emergency department presentation were less likely to re-present to the emergency department within the month however, rural adults were less likely to have a follow up than urban residents. There was no significant difference in follow ups for children residing in rural and urban locations.
Horner (2008)	United States of America	Identify factors impacting asthma morbidity in rural children.	Exploratory analysis.	Children experiencing more severe asthma had higher rates of school absences and hospitalisations. Families who had difficulty accessing care had higher rates of hospitalisations and emergency department visits
Boyd & Archer (2007)	Australia	Investigate barriers to optimal emergency healthcare in rural Australia.	Needs analysis.	Issues such as underestimation of the severity of asthma and delays in seeking paramedic assistance were found to be modifiable with education. This education program was found to have high user satisfaction and resulted in several participants stating they would be more likely to utilise ambulance services due to this education package.
Doherty, Jones, Davis, Ryan & Treeve (2007)	Australia	Determine if an evidence-based implementation strategy can lead to the implementation of successful guidelines for adult asthma management in a large rural emergency department.	Pre and post intervention trial.	Evidence-based implementation had a significant impact on the improvement in several areas of asthma management in the rural emergency department. These improvements were also maintained during a 12 month follow up.
Doherty, Jones, Stevens, Davis, Ryan, & Treeve (2007)	Australia	Determine if evidence-based implementation can lead to improved compliance with asthma management guidelines for children in a large rural emergency department.	Pre and post intervention trial.	Evidence-based intervention was shown to improve compliance in several asthma management guidelines in paediatric patients. These results were also maintained at a 12 month follow up.
Van der Merwe, De Klerk, Kidd, Bardin & Van Schalkwyk, (2006)	South Africa	Distinguish risk factors for severe/life threatening asthma in developing communities in South Africa.	Case control study.	Rural residence may increase the risk of severe/life threatening asthma as well as decrease access to specialised care having negative effects on asthma outcomes.
Butz, Pham, Lewis, Lewis, Hill, Walker, et al., (2005)	United States	Determine the effectiveness of an asthma educational intervention on improving quality of life of rural families.	Randomised clinical trial.	Interactive asthma education intervention was associated with increased knowledge and decreased symptom reports in rural children and overall improved asthma knowledge in both parents and children.
Morgans, Archer, Walker & Thuma (2005)	Australia	Explore the perceptions of the role of health services in acute asthma management and asthma health promotion.	Community based focus groups.	Rural perceptions of asthma acted as barriers to accessing emergency healthcare effectively. These misconceptions were concerning in rural areas where distance has a significant effect on response times.

Table 3 (continued). Literature review findings.

The key themes identified in the literature were the impacts of a lack of access to resources; individual behaviours and attitudes; education and health literacy; and rural clinician compliance with guidelines. These factors had an impact on how rural asthmatics were able to access and receive emergency care in an asthma-related emergency.

ACCESS TO RESOURCES

A lack of access to resources due to challenges associated with geographical location can act as a barrier to accessing rural emergency care for asthma-related emergencies. This is highlighted by Van der Merwe et al. (2006) whose South African study concluded that rural residence may increase the risk of poor asthma outcomes. This is complimented by Kassean and Poordil (2011) another African study that recommended there needs to be improved emergency medical units to provide a better distribution of services across regional locations that have a higher number of asthma call outs. Furthermore, Fische et al. (2019) analysed the effects of regionalisation on rural paediatric asthma patients in Florida and identified that paediatric asthma care was focused on urban specialty centres.

This resulted in Emergency Medical Services (EMS) having to travel longer distances to admitting facilities for the rural paediatric asthma population leading to more complex decisions being made, with the longer transport times also impacting EMS availability (Fishe et al., 2019). More recently, Fecho et al. (2022) explored factors which influenced asthma exacerbations in the United States. Their findings demonstrated patients residing in rural areas had higher annual emergency department (ED) presentations or inpatient visits for respiratory issues than those in urban areas. They also noted that asthma exacerbations were more significantly associated with rural residents and those who had exposure to relatively high levels of particulate matter 2.5 microns or less in width or ozone (Fecho et al., 2022).

Horner (2008) highlights asthma morbidity in rural school-aged children and indicated a higher rate of hospitalisations and ED visits in families who have difficulty accessing care emphasising the effects that geographical location can have on asthma-related health outcomes. Similarly, Pate et al. (2021) indicated that those who lived rurally had poorer health outcomes than those in urban areas and associated this with reduced access to healthcare, living in locations which had a higher prevalence of hospital closures, shortages in the healthcare workforce and increased distances to travel to receive emergency healthcare. This study which characterised asthma indicators throughout the United States found that adults had a higher number of ED visits in urban than rural areas although asthma-related mortality rates were higher in rural areas. Pate et al. (2021) speculated that ED visits may be lower in rural areas due to the difficulty accessing emergency healthcare. Meanwhile, Juturu (2021) investigated the impact of living rurally and having reduced access to health resources on asthmatics in the Salton Sea region of Imperial County (California, USA) where the average road travel time to medical attention was 50-61 mins. This area had a high asthma prevalence and lacked the resources to be able to manage asthma-related illness (Juturu, 2021). These studies suggest that difficulty accessing emergency healthcare may be preventing asthmatics in rural areas from receiving equitable healthcare during an exacerbation.

Telehealth has been mentioned throughout the literature as a tool to address barriers associated with accessing healthcare in rural areas. Kew and Cates (2016) assessed the efficacy and safety of home telemonitoring by a healthcare professional. They concluded that they were unable to find any clear evidence suggesting whether telemonitoring had an influence on the prevalence of exacerbations/ED presentations, however they did suggest that home telemonitoring may reduce inequalities in healthcare for those in rural areas by improving access to specialist services. Further evidence was provided by Bian et al. (2019) who examined the association of school-based telehealth programs with ED visits in South Carolina. Whilst there was no statistical association of this program with ED visits, they noted the potential health benefits that telehealth can provide to rural and medically underserved communities for paediatric diseases such as asthma. Meanwhile, Locke et al. (2019) reviewed the use of telehealth to improve medication compliance and inhaler technique in rural asthmatics and noticed an improvement in inhaler technique during the first session. However, whilst there was improvement in inhaler usage and high satisfaction with the program, there was no significant difference in asthma-related hospitalisations pre and post the telehealth training (Locke et al., 2019).

Overall, the literature indicates that a lack of access to resources for reasons such as geographical location can have a significant influence on the treatment and time taken to re-

ceive definitive care in patients experiencing asthma exacerbations. Fische et al. (2019) and Van der Merwe et al. (2006) recommended further research on the impact of these factors on asthma care and a focus on reversible risk factors to reduce the effect that location has on negative asthma outcomes. The literature implies that the utilisation of telehealth services in rural areas may provide benefit to management of asthma in rural areas by making it easier to access asthma education and General Practitioner (GP) consultations. However, it does not provide a solution to the issue of difficulty accessing emergency healthcare in an asthma-related emergency. Juturu (2021) highlighted there was a need to collect and assess data on acuity levels of asthma-related emergencies to determine what emergency services were needed in rural areas.

INDIVIDUAL BEHAVIOURS AND ATTITUDES

Individual behaviours and attitudes were also seen to influence access to emergency healthcare for asthma exacerbations in rural areas. Results from focus groups carried out by Morgans et al. (2005) involving rural asthma patients in Victoria, Australia showed that patients were less likely to seek emergency healthcare via an ambulance service due to underestimating the severity of their asthma, thinking it was not a 'real' emergency, response time delays and the attitude that they could get themselves to hospital more quickly. However, this attitude did not account for the lifesaving treatment which can be implemented enroute to hospital resulting in patient improvement before reaching the ED. Furthermore, Morgans et al. (2005) also conducted a patient care record audit which clearly displayed that paramedic intervention for asthma was appropriate and led to immediate respiratory improvement highlighting gaps in the health literacy of the participants in their study.

Similarly, Withy and Davis (2008) looked into the rate of GP follow up visits after ED presentations for asthma in Hawaii. The data showed that an in-office follow up with a GP decreased the likelihood of another ED presentation within the same month by 10%. When comparing rural and urban areas it was found that rural adults were less likely to have a follow up visit however, there was no significant difference in follow up visits between rural and urban paediatric asthma patients. This indicates that rural adults are less likely to engage in follow up visits for themselves than for their children indicating some attitudinal issues acting as a barrier to receiving follow up healthcare ultimately highlighting how attitudes can be a barrier which hinders access to healthcare in rural areas.

Both studies highlight specific attitudes and behaviours which impact on the access to emergency healthcare for asthma exacerbations in rural environments. This can lead to suboptimal resource utilisation including the underutilisation of ambulances and delays in accessing these resources resulting in negative asthma outcomes (Morgans et al., 2005). Morgans et al. (2005) suggested the need for further public education campaigns to improve health literacy regarding the utilisation of ambulance services for treatment and transport to ED for asthma exacerbations in rural areas.

EDUCATION AND HEALTH LITERACY

Another common theme in the literature was substandard levels of health education in rural and remote areas. Authors such as Boyd and Archer (2007) and Morgans et al. (2005) have uncovered gaps in health literacy which impacted on access to emergency

healthcare. Morgans et al. (2005) reported an educational barrier in asthmatics in rural Victoria around accessing emergency healthcare for asthma exacerbations. A misunderstanding of paramedic roles was highlighted in addition to not knowing when it was appropriate to call for an ambulance. Morgans et al. (2005) also found that these education gaps were evident in both patients and medical professionals which was significantly concerning when looking into the quality of access to emergency healthcare in these areas. Similarly, Boyd and Archer (2007) found that despite data showing paramedic intervention can improve asthma outcomes in rural Victoria, the utilisation of ambulance services for asthma was suboptimal and there was an underestimation of the severity of asthma resulting in delays seeking paramedic assistance. To address this, Boyd and Archer (2007) developed an asthma education strategy targeting both health professionals and their patients. They utilised a multimedia education package which was shown to have high levels of user satisfaction with 64% of participants stating they were more likely to call for an ambulance in an asthma-related health emergency as a result of the education package (Boyd & Archer, 2007).

Furthermore, this support for asthma-related education programs is found in literature throughout the world. In 2005, Butz et al. (2005) investigated the effectiveness of asthma education in rural families on improvement of self-efficacy in asthma management, quality of life and asthma knowledge. Although these interventions did not improve quality of life, they did improve participants' asthma knowledge and self-efficacy in children but not adults. In another study, Larson et al. (2010) revealed that structured asthma education delivered in GP practices was an effective way of preventing asthma exacerbations and improving asthma management. This was achieved by delivering educational sessions which covered the pathophysiology of asthma, signs and symptoms, triggers, correct use and administration of medications and the development of an asthma action plan. The findings of this study showed an increase of preventer medication use and use of a spacer, perception of improved quality of life and a decrease in unscheduled GP appointments for exacerbations. The data from this study also indicated that the educational sessions and asthma action plans may have reduced the number of asthma-related hospital presentations (Larson et al., 2010). More recently, Agusala et al. (2018) investigated the impact of asthma education for paediatrics in rural Texas and noted asthma education reduced hospitalisations, ED visits and school absences. Through educating both parents and children it was reported there was an increase in confidence in asthma management, and a better understanding of signs, symptoms, and triggers. Meanwhile, Braithwaite et al. (2018) examined the quality of healthcare for Australian children including those in rural areas and identified written asthma management plans as a significant tool in improving asthma management, resulting in fewer school absences and better relationships with health services. However, Braithwaite et al. (2018) also acknowledged that whilst 92% of children discharged from hospital following an asthma exacerbation were given an asthma action plan, only 47% of children prescribed an asthma preventer were provided with an asthma action plan.

Overall, the literature revealed that maintaining the standard of education and health literacy is vital in emergency asthma management to prevent the underestimation of the severity of the disease and suboptimal use of both self-administered medications and emergency healthcare access (Boyd & Archer, 2007; Larson et al., 2010; Morgans et al., 2005). It is imperative that education is provided in rural areas so that asthmatics have a

good level of health literacy allowing them to make informed decisions regarding their emergency asthma management. This along with comprehensive asthma action plans has the potential to decrease negative asthma outcomes in rural populations (Braithwaite et al., 2018).

RURAL CLINICIAN COMPLIANCE WITH GUIDELINES

Rural clinicians' compliance with guidelines was also found to be of relevance when examining emergency healthcare access for asthma exacerbations in rural areas. Doherty, Jones, Davis, et al. (2007) and Doherty, Jones, Stevens, et al. (2007) both evaluated the influence of implementing evidence-based interventions in improving the management of rural asthma exacerbations in adults and paediatrics in a large rural Australian ED. These studies initially found a low rate of compliance with current asthma guidelines followed by a significant improvement in the management of asthma exacerbations through the utilisation of evidence-based interventions. Important interventions included improved compliance with guidelines with seven main clinical indicators identified as significant, including pharmacological treatments, correct administration of drugs, documentation, and asthma management plans all of which were maintained after a twelve month follow up. (Doherty, Jones, Davis, et al., 2007; Doherty, Jones, Stevens, et al., 2007). To support this Shaw and Siriwardena (2014) explored attitudes and perceptions of regional paramedics about their prehospital treatment of asthma exacerbations to evaluate guideline adherence in the United Kingdom. They found limited research into prehospital adherence to guidelines and identified five themes including the relevance of the guidelines to the prehospital environment, barriers to assessment, conflicts in expectations of patients and clinicians, complexity of processes and equipment as well as opportunities for education. Overall, these studies highlight the importance of evidence-based practice in the management of asthma exacerbations. Furthermore, these studies uncovered shortfalls in the compliance with asthma guidelines. It is vital that issues with compliance are kept to a minimum in rural areas to ensure they are not acting as a barrier to accessing evidence-based emergency healthcare for asthma exacerbations in an environment where there are already several obstacles which may need to be overcome just to get to the clinician's doorstep.

DISCUSSION

The aim of this scoping review was to explore the impact that residing in rural areas has on accessing emergency healthcare for an asthma-related emergency. This review has identified access to resources; individual behaviours and attitudes; education and health literacy; as well as rural clinician compliance with guidelines as factors influencing asthmatic's access to emergency healthcare during asthma-related emergencies.

Access to resources was found to affect access to emergency healthcare and a significant part of that was due to the geographical environment specific to rural areas. Aftyka et al. (2014) and Wilde (2013) concurred, describing how issues associated with the longer distances, obscure landmarks and hostile terrains which need to be traversed in order to reach patients in rural areas impacted on response times, affecting mortality rates and hospital admission rates. Other obstacles, such as labelling of landmarks, muddy roads and poor radio and phone reception can further impact response times increasing the likelihood of requiring clinical interventions on scene to stabilise patients in rural areas

rather than common load and go tactics associated with more urban areas (Aftyka et al., 2014). Limited resources in rural areas are also discussed in Bourke et al. (2004) including workforce shortages which have led to poorer access to healthcare for rural populations. This makes services more difficult to access resulting in longer travel times and greater financial stressors. Similarly, Piggott et al. (2021) highlighted that the availability of dental services was limited in areas with low population density. Consequently, this resulted in infrequent visits from dental clinicians to rural areas acting as a barrier for rural residents to receive dental care due to a lack of access to resources. Situations like this can lead to alternative methods of assessment and management such as telehealth which has been successfully implemented for the detection of skin cancers in rural areas (Adelson & Eckert, 2020). A study in Greenland reported the effective use of telehealth in accurately diagnosing patients with respiratory conditions in remote areas allowing early emergency treatment to be initiated whilst retrieval was arranged implying that telehealth may be appropriate for the emergency management of asthma in remote areas. Health services with limited resources should work together to increase the availability of emergency healthcare in rural areas, reducing inequalities in access (Penninga et al., 2020).

Individual behaviours and attitudes can shape how and when people choose to access emergency healthcare. As a response to limited healthcare in rural areas, patients are creating their own self-management strategies to control their asthma and have been known to call friends, neighbours or even their local doctor before deciding to call for an ambulance during an asthma-related emergency (Cvetkovski et al., 2009; Morgans & Archer, 2005). However, whilst Cvetkovski et al. (2009) saw self-management strategies as an alternative to decrease the need to access emergency healthcare, Fennell et al. (2018) articulated self-reliance and control as an attitudinal barrier in accessing healthcare in rural South Australia for a mental health concern. This poses the question of whether self-management strategies are beneficial or cause further barriers to accessing essential care in potentially life-threatening situations.

Additionally, levels of education and health literacy can demonstrate gaps in knowledge which can limit access to emergency healthcare in rural areas. This is further portrayed through Franks et al. (2005) a rural pharmacy study that concluded reliever medications were over utilised while preventer medications were underutilised demonstrating poor knowledge of asthma medications by the rural participants. This highlighted a need for modification of the provision of education and health literacy by recognising that patients needed further education to develop a fuller understanding of their medications and improve asthma outcomes (Franks et al., 2005).

Finally, a healthcare system that is up to date with evidence-based guidelines and demonstrates adherence to these guidelines is significant when accessing rural emergency healthcare. Adams et al. (2019) emphasises that keeping up with education is an issue for paramedics and nurses who work in remote industrial roles with a broad scope of practice where some skills are rarely used. This sense of professional isolation inhibits further access to education and professional development opportunities foreshadowing a need for more education to alleviate stress related to professional isolation and to support practice needs. This is reiterated by Cvetkovski et al. (2009) whose findings shared the perceptions of rural pharmacists that the restricted availability of professional development opportunities were limiting their provision of asthma management in

rural areas. Furthermore, O'Meara et al. (2012) identified trends in how rural paramedic practice was evolving with paramedics becoming first line primary healthcare providers in small rural communities highlighting the need for an expansion of rural paramedics scope to be able to comply with the needs of both emergency and primary health of rural communities. Spencer-Goodsir et al. (2022) summed this up, highlighting the opportunities for paramedics in rural areas to be used to tackle identified gaps in healthcare however noted the importance of further professional development to support the clinicians working in these extended roles.

LIMITATIONS

A limitation of this study is that only articles published in English were considered. Whilst this may have resulted in some potential sources not being identified, the purpose of this study was to investigate the factors impacting decision-making of asthma patients accessing emergency healthcare in Australia so non-English publications would not have been relevant to this context. Articles published in other countries were taken into consideration due to the limited research on this topic carried out in Australia. Finally, the research from the Australian context is dated indicating a need for more contemporary research to ensure any recent changes to the service structure or delivery of rural healthcare have been accounted for.

CONCLUSION

Through the literature identified in this scoping review, it was established that there are several influences/barriers associated with living in rural areas that may impact patients ability to access emergency healthcare during an asthma-related emergency all of which are interconnected. This was shown through environmental concerns and decreased access to resources creating barriers to accessing emergency healthcare. Additionally, individual behaviours and attitudes, alongside education and health literacy and rural clinician compliance to guidelines were also seen to be influences which may impact the ability to access emergency healthcare in the rural environment during an asthma-related emergency. Due to these discrepancies in environmental concerns, access to resources, individual perceptions and rural clinical compliance, further research is recommended to establish the current extent to which these obstacles are influencing rural patients health outcomes and to explore solutions to support the delivery of equitable emergency healthcare in these locations.

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