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Improving early detection of infection in nursing home residents in South Africa

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ABSTRACT

This paper sets out key challenges related to detection and management of infection in nursing home residents, and then explores the situation in South Africa, and use of decision support tools as a mechanism to improve this area of practice.

In line with global trends, concerns have been raised about the rapidly increasing aging population in South Africa and the ability of the current healthcare system to keep pace with patient demand, particularly nursing home residents. Nursing home residents, who often exhibit atypical signs and symptoms, are at increased risk of infection and unplanned admissions, which account for 65% of all bed days, and cost the US healthcare economy more than a trillion dollars a year. Evidence suggests that the current workforce in South Africa receive limited training in this area and are largely unprepared to meet the demands of the aging population. Building the capacity and skills of the workforce in South Africa is one approach that could help to improve the early detection of infection and assist the nursing home workforce to provide more effective and timely care, particularly during the current COVID-19 pandemic.

Decision support tools, such as the Early Detection of Infection Scale, can help ensure consistency and ensure more timely treatment, minimising unplanned admissions and healthcare expenditure. However, the potential benefits or indeed how easily this could be integrated in to nursing homes in South Africa is unknown. An important first step, as in other parts of the world, is therefore to explore views and opinions of how infections are detected and managed in practice by nurses, care workers and managers in nursing homes.

1. Introduction

This paper provides a general overview of the challenges related to the detection and management of infection in nursing home residents, and then explores the situation in South Africa. In so doing the paper is able to: i) distinguish the specific influences on the system of care for older people in nursing homes in South Africa and, ii) consider the use of decision support tools as a mechanism to improve this area of practice.

As life expectancy increases, global level predictions indicate >2 billion people will be aged 65 years by 2050, with the number >80 years expected to reach 400 million by 2050 (GBD 2016 Disease and Injury Incidence and Prevalence Collaborators, 2017; Holloway & Henry, 2014). The implications for managing the increased pressure this will have on healthcare resources and the ability to meet patient demand around the world are profound.

The care of nursing home residents who are at increased risk of infection and unplanned hospital admissions resulting in clinical complications, increased mortality and extended length of stay is a growing concern for the global community, as demonstrated during the ongoing COVID-19 pandemic (Dwyer, Gabbe, Stoelwinder, & Lowthian, 2014; Jacobs, Ashwell, Sumaiyah, & Schneider, 2020; Lemoyne et al., 2019; OECD, 2020). Unplanned admissions now account for 65% of all hospital bed days (Busby, Purdy, & Hollingworth, 2015; Mkanta, Chumbler, Yang, Saigal, & Abdollahi, 2016): this pressure is set to intensify further in line with the projected rise in people aged 80 years and above, and the subsequent rise in the number of nursing home residents (Dwyer, Stoelwinder, Gabbe, & Lowthian, 2015; Lemoyne et al., 2019; OECD, 2017).

Nursing home residents are at 1.4 times greater risk of emergency admission and have >50% unplanned hospital admissions compared to

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the general population aged >75 years (Dwyer et al., 2015; McAndrew, Garbowski, Dang, & Young, 2016). Unplanned hospital admissions cost the NHS >£11 billion and the US healthcare economy >\$1.1 trillion a year (Busby et al., 2015) and account for more than a third of all admissions each year (Dwyer et al., 2014, 2015; Smith, Sherlaw-Johnson, Ariti, & Bardelsy, 2015). However, evidence suggests that many nursing home residents' hospitalisation can be avoided through rapid detection and more timely treatment (Dwyer et al., 2015; Lemoyne et al., 2019; OECD, 2017; Smith et al., 2015).

There is therefore an urgent need to improve the early detection of infection to avoid unnecessary hospital admission and risk of complications for nursing home residents (Dwyer et al., 2015; Lemoyne et al., 2019; McAndrew et al., 2016).

2. Aged care provision in South Africa

Similar concerns are beginning to emerge in South Africa, reflecting global trends and an aging population with multiple long-term conditions (World Health Organisation, 2016). South Africa has one of the fastest-aging populations on the continent; the United Nations predicts that between 2009 and 2050, the country's population over the age of 50 will double to 14% (AARP, 2016). In comparison to the UK, US and other western countries, the provision of care for older people in South Africa has historically been quite different with care being provided at home within the family environment (Lloyd-Sherlock, 2019; van Biljon & Roos, 2015). Changes to family structures in African families, caused by HIV/AIDS and marked by a lost generation who previously cared for older persons (WHO, 2020; World Health Organization, 2017), means that over a third now require help and assistance with daily living (World Health Organization, 2017).

Care arrangements, similarly to elsewhere, are influenced by financial and human resources, the older persons' level of functional independence and their associated living arrangement (Dwyer et al., 2015; van Biljon & Roos, 2015). There are three main types of living arrangements; i) 'independent living'; for people aged over 60, where accommodation is located in a purpose built retirement village with onsite healthcare facilities; ii) 'assisted living' where by the older person resides in their own apartment/house with support to maintain their activities of daily living; and iii) 'frail care' which involves a 24-h healthcare service for those with severe frailty/or who are bedridden.

Residential care facilities became available to all South African citizens at the end of the apartheid era, regardless of race (van Biljon & Roos, 2015). However, their structure and organisation has been strongly affected by the historical effects of the apartheid era (Feinstein, 2005), the legacy of which has left the country with a myriad of service models and a fragmented healthcare system delivered through a public and private system. This fragmentation creates a dilemma in terms of ensuring older people have access to long-term care South African, particularly in rural areas.

In addition to the challenge of ensuring access, the quality of care at the 1150 nursing homes for older people in South Africa, of which only 400 are registered (Jacobs et al., 2020) are also challenged by a lack of financial support, lack of human resources and capacity of staff (Dwyer et al., 2015; van Biljon & Roos, 2015).

There are significant financial challenges regarding care provision for older people in South Africa, many of whom suffer financial hardship. Firstly, the pension grant of R1860 per month (approximately £89/month), only received by those who are eligible (South African Government, 2020), is insufficient to support a basic living standard. The situation is complicated further as it is widely observed that older people frequently share pensions with household members, and that this arrangement is not always consensual (Lloyd-Sherlock, 2018). Similarly to other parts of the world the basic pension allowance in South Africa only covers a fraction of the cost of residential nursing care (Ranchod, Childs, Abraham, & Taylor, 2015). As a result, charitable and government nursing homes, historically the main providers of care home

services in South Africa, are subsidised to cover the costs for the poor: the total cost of this scheme in 2014 being £50 million (Lloyd-Sherlock, 2018). Despite the limited available data in South Africa, concerns have been raised about the economic viability of services provided by nursing homes; treatment of residents and the growing number of informal unregistered nursing homes across the country, limited state oversight of the situation, and the additional resultant strain this places on the workforce (Lloyd-Sherlock, 2018; van Biljon & Roos, 2015).

Similarly to the nursing home workforce in Europe, direct care is mainly provided by staff nurses/enrolled nurses with a two-year training, assistant nurses with one-year training and caregivers (South African Nursing Council, 2020). However, a recent WHO report indicated that the current workforce in Sub-Saharan Africa, who receive limited formal caregiver training, is inadequate with care providers in South Africa largely unprepared to meet the demands of an aging population (Mapira, Kelly, & Geffen, 2019; World Health Organization, 2017), with only a small percentage of South African registrants specialising in gerontological nursing (South African Nursing Council, 2020). Only a quarter of staff in a 2010 national survey of 405 regulated homes for example, knew about official norms and standards of care, and did not feel suitably equipped to care for residents with complex care needs, such as dementia. There were indications of poor working conditions, including low pay and lack of managerial support, with 20% reporting they never had access to a trained nurse (Government of South Africa, 2010). Additionally, there is evidence of ongoing low uptake of the accredited short course available to caregivers enabling them to register as a caregiver for older people on completion (South African Government, 2019), with only 120 candidates completing training over 2015/2016 (South African Government, 2016).

Despite this, nurses, particularly enrolled and assistant nurses and caregivers, who continue to have the most direct contact with residents, tend to be the first people to identify change in psychological and/or cognitive behaviour. Emerging evidence suggests decision support tools which provide a systematic approach to monitoring non-specific cognitive and behavioural changes can help ensure consistency and more timely treatment (Lemoyne et al., 2019; Smith et al., 2015). Building the capacity and skills of the workforce in South Africa so they are supported to identify the signs and symptoms of infection in nursing home residents is one approach that could help alleviate some of the pressure experienced by nursing home staff (Lemoyne et al., 2019). This in turn should improve the early detection of infection and assist the nursing home workforce in providing more effective and timely care.

3. Management of infections in nursing homes in South Africa

It is recognised that guidelines and criteria developed in the US such as 'McGeer' (Stone et al., 2012), and/or 'Loeb' (Caterino et al., 2017) can support the surveillance and management of infections in long-term care facilities. However, until very recently, and in response to the COVID-19 pandemic, there was a lack of national standardised infection control guidelines for use in nursing homes in South Africa (Department of Health, 2020). This despite the agreement that older people in middle and lower-income countries, including South Africa are at increased risk of infection. This increased risk is confirmed in the context of South Africa and Sub-Saharan Africa in various studies including hospitalisation for respiratory infections (Kyeagalire et al., 2014; Nkosi, Wichmann, & Voyi, 2015; Pillay-van Wyk et al., 2016), diarrheal illnesses (Lamberti et al., 2014), lower urinary tract symptoms (Maharajh, Abdel Goad, Ramklass, & Conradie, 2015) and fall-related injuries (Stewart Williams et al., 2015). Although it is well-known that wounds such as skin tears, chronic leg ulcers, diabetic foot ulcers and pressure ulcers are common among older persons and are a priority of care in nursing homes (Edwards et al., 2017), incidence or prevalence studies of wound types in nursing homes in South Africa is lacking.

In practice, the identification of infection is generally based on detection of abnormalities during routine physiological measures such

as heart rate, blood pressure, respiration or urine analysis. Any deviations observed by the caregiver or nursing assistant are reported to the registered nurse supervising the care who will decide on the course of treatment, need for referral to a general medical practitioner or hospital admission. While some nursing homes have used the World Health Organisation guidelines to inform the development of general infection control procedures; these focus on the presence of clinical signs and symptoms and fail to acknowledge that frail elderly often exhibit atypical signs and symptoms making it difficult to make a diagnosis and initiate treatment (Caterino et al., 2017; Sund-Levander & Tingstrom, 2013; Tingström et al., 2015). Consequently, the diagnosis and treatment of infection in the frail elderly can be difficult contributing to delayed assessment.

It is recognised that hospital admissions of older people from nursing homes are influenced by a number of individual and organisational factors (Dwyer et al., 2015; Lemoyne et al., 2019). Individual factors are for example, associated with the presence of particular comorbidities i.e. diabetes, and heart failure and reduced functional ability whereas organisational factors include “for profit” facilities”, poorer staff to patient ratios, and a lack specialist knowledge compared with those owned by not-for-profit organisations and those with improved registered nurse and medical practitioner staffing levels.

Emerging evidence however, suggests decision support tools (DST), which provide a systematic approach to monitoring non-specific cognitive and behavioural changes, can help ensure consistency; allow nurses to be more professional and effective at communication, ensuring more timely treatment (Tingström et al., 2015). Such systems, when not reliant on physiological measures requiring clinical interpretation, may also allow delegation of use to nursing home care support staff, such as caregivers, to recognise and report changes in condition (Morley, 2014; Ouslander et al., 2011; Ouslander, Bonner, Herndon, & Shutes, 2014; Tena-Nelson et al., 2012; Tingström et al., 2015). They are well-positioned to undertake these activities due to their consistent caregiver relationships with residents (Ashcraft & Owen, 2014; Tingström, Milberg, & Sund-Levander, 2010).

Training these staff members to recognise and communicate signs of deterioration, through decision support tools could provide patient benefit by reducing and or preventing hospital transfers (Ashcraft & Owen, 2014; Boockvar, Brodie, & Lachs, 2000). Nursing home oriented decision support tools such as Stop and Watch (Ouslander et al., 2014), rely primarily on observational assessment in order to identify residents who requires closer monitoring that will result in not only more frequent observations but also more frequent recording of vital signs. Another tool, the Early Detection of Infection Scale (EDIS) Allemann & Sund-Levander, 2015; Sund-Levander & Tingstrom, 2013; Tingström et al., 2010, 2015), designed for completion by Swedish care workers, also includes assessment of body temperature. The assessment of body temperature uses a new approach based on the difference from baseline, the so called ‘DiffTemp®’ instead of pre-decided values for fever, i.e. >38 °C (Sund-Levander & Grodzinsky, 2017). Recording ‘DiffTemp’ as part of EDIS enables a more targeted approach focusing on specific aspects of behaviour and functional status. The use of DSTs for rapid early detection of infection in nursing home residents in South Africa could prove helpful (Ouslander et al., 2014; Tingström et al., 2015) and help mitigate the spread of COVID-19 during the current pandemic and beyond (OECD, 2020).

However, the potential benefits; or indeed how easily a decision support tool could be integrated within the context of South African nursing home organisations has not been explored. Exploring barriers and facilitators to successful implementation of the early detection of infection scale in South African nursing home residents is therefore key to understanding how best to implement and maintain the early detection of infection scale instrument in daily clinical practice. A current UK-based study is exploring views and opinions of how infections are detected and managed in practice by nurses, care workers and managers in UK nursing homes (Carey, Mold, Cox, Lund-Sevander, & Tingstrom,

2019) and other countries (Carey, 2019).

Exploring nurses, care workers and managers views and opinions of how infections are detected and managed in practice by nurses, care workers and managers is an important first step to understanding enabling and reinforcing factors related to successful adoption; implementation and maintenance of the early detection of infection scale instrument; potential barriers, support and resources needed to implement and maintain the early detection of infection scale in daily clinical practice. In order to improve the early detection of infection in South Africa, it will therefore be essential to adopt a similar approach to the UK.

4. Conclusion

There is a need to improve the early detection of infection in nursing home residents who are at high risk of rapid deterioration and unplanned hospital admission, clinical complications and general deterioration. The importance of early detection of infection has been emphasised during the current global COVID-19 pandemic. Evidence suggests that decision support tools provide an opportunity to improve early detection of infection and ensure a consistent approach to infection detection, prompt action and treatment, thus avoiding emergency hospital admissions. Similarly to the UK, exploring views and opinions of how infections are detected and managed in practice by nurses, care workers and managers in nursing homes will be an important first step to understanding the potential use and acceptability of the early detection of infection scale tool in South Africa.

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CRediT authorship contribution statement

Nicola Carey: Conceptualization, Writing - original draft, Writing - review & editing. **Geertien Christelle Boersema:** Conceptualization, Writing - original draft, Writing - review & editing. **Helena S. du Toit:** Conceptualization, Writing - original draft, Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

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