Mapping Health Literacy Strategies and Outcomes in Older Adults: A Scoping Review

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ABSTRACT

Background: Older adults are currently the fastest aging population in Canada and the United States, yet, have the lowest levels of health literacy in the population. Research supports that consequences of low health literacy are poorer related health outcomes and health status. The aim of this scoping review was to summarize the extent of the literature of health literacy on health outcomes in older adults and identify strategies that aim to increase health literacy.
Methods: A scoping review was completed via online search of the literature using Medline, ERIC and PsychInfo databases, using key terms: functional health literacy and older adults. Inclusion criteria included the following: explicit focus on health literacy, publication in English, older adult population, primary research studies conducted in Canada or USA.
Results: The initial search yielded 238 articles, after title screening and abstract reviewing 48 articles were screened for the full text. 15 articles met the inclusion criteria and were included. This scoping review identified several interventions in heart failure, asthma, hypertension and diabetes, that aim to increase health literacy in the elderly population, however no studies found change in health literacy and health outcomes in the long term.
Conclusion: There is much future work needed to address health literacy in older adults on interventions, long term health outcomes and education for health care providers.

INTRODUCTION

Older adults have the lowest levels of health literacy (HL) in the population, and the highest rates of chronic disease(1). They often struggle with managing one's own health and have poorer related health outcomes. With an understanding of the relationship between HL and health outcomes, there is a demand to encourage and foster the growth of HL for older adults to take control over their own health. To date, there has been no effective strategies or health outcomes related to HL for this particular population. This scoping review will map the nature and extend of research related to HL and health outcomes in older adults.

Background

According to the Institute of Medicine, HL is defined as, "The degree to which individuals can obtain, process and understand health information and services they need to make appropriate decisions,"(2). The broad concept of HL consists of an array of many skills, required to navigate the health care system and act on health care decisions. Examples of key skills may be reading, communication, decision making, and critical thinking as well as digital and print literacy. The skills of HL are required to complete tasks such as reading and interpreting medication labels, medical instructions, education materials and resources, completing insurance forms, following instructions for diagnostic tests, understanding diagnoses and a general understanding of health-related materials in order to effectively navigate the health care system (1). The consequences of poor HL are decreased access of preventive services, poorer engagement, compliance rates and self-reported health, decreased understanding of medial information, increased hospitalizations, deaths and health care costs (1). Across North America, research suggests that the population with the lowest levels of HL is adults over the age of 65 (1,3).

Older adults are currently the fastest aging population in North America. It is estimated by 2040, 25% of the Canadian population will consist of older adults and by 2050, 23% of the American population will consult of adults over the age of 65 (4). With an aging population, there is a great demand to supporting the health and wellness for the elderly. Older adults take more medications, have a greater burden of chronic disease and are often less able to perform independently in necessary tasks to manage their own health(3). Currently, chronic disease is the leading cause of morbidity and mortality worldwide, accounting for a total of 60% of deaths (5).

There is existing evidence to support that fostering and encouraging HL is a promising and cost-effective approach to overcome rates of chronic disease death and reduce health disparities (3–5). Despite the aging population, there is minimal research on evidence based materials, resources and education that can aim to improve HL in older adults. Acknowledging the need for improvement in HL in older adults, a scoping review of the literature on HL in older adults was performed to examine and summarize the current evidence and identify gaps in research. The specific research questions that this scoping review addressed were:

1. What is the extent of and nature of research regarding health literacy as a factor associated with health outcomes?
2. What evidence exists to support various strategies to address low literacy in older adults?

METHODS

A scoping review is performed to identify existing literature for HL in older adults and to identify gaps in this research.

Literature Search strategy

To ensure a comprehensive search of the literature, the following electronic databases were searched for articles: Medline, ERIC and PsychInfo. The search strategies were developed in consultation with a health sciences librarian included the following terms ("functional health literacy" OR "health literacy") AND ("older adults" OR "aged"). A full search can be seen in Appendix 1. These terms were searched as titles, abstracts, keywords and MeSH. The searches were limited through December 15, 2023- February 2, 2024.

Inclusion and Exclusion Criteria

Articles that were included met the followed criteria: Explicit reference to health literacy, a focus on the older adult population, English speaking, primary research studies, geographical location of Canada or USA and were published from 2006-2024. Articles were excluded if they were missing abstracts, reviews, commentary, or opinions.

RESULTS

The process of the review search and exclusion is shown in Figure 1. The initial search of the electronic databases yielded 238 articles, of which 48 articles remained for full-text screening. There was a total of 15 articles that met the inclusion criteria and were included in this scoping review.

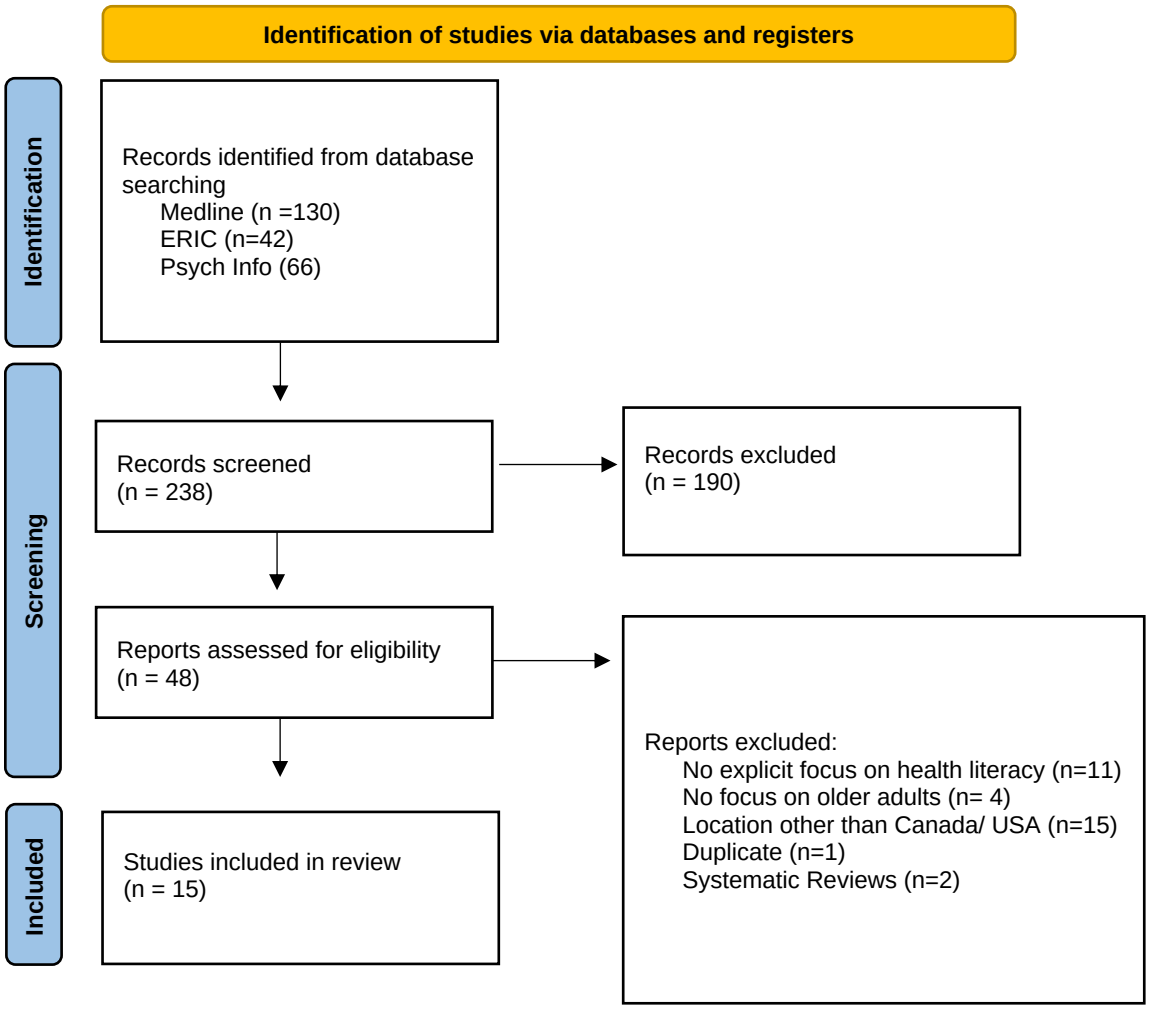

Fig 1. PRISMA (Preferred Reporting Items for Systemic Reviews and Meta-Analysis)

Health Literacy Definition

Eleven articles explicitly defined HL. In ten of the articles, HL was defined according to the Institute of Medicine as, "The degree to which individuals have the capacity to obtain, process and understand health related information in order to make appropriate health decisions," (6–15). Geboers et al defined HL as, "The degree to which people are able to access, understand, appraise and communicate information to engage with the demands of different health contexts in order to promote and maintain good health across the life-course,"(12).

Measurement of Health Literacy

There were fourteen studies that directly measured HL, and eight different measurement systems were used to assess HL in the studies included. Eight of the total articles assessed HL with the Short Test of Functional Health Literacy in Adults (S-TOFHLA) a test designed to capture a patient's ability to read and understand health content and numeracy skills (6,7,9,10,15–18). The exercise consists of a 36 item reading comprehension and numeracy exercise, and scores from the assessment then are categorized into varying levels of HL (6,15). In the study conducted by Gomez et al, studying HL in HIV, several measurements were used to assess HL: The Brief Health Literacy Screening (BHLS), The Newest vital sign (NVS), Beliefs related to medication adherence (BERMA) and the Rapid Estimate of Adult Literacy in Medicine (REALM) (19).The Brief Health Literacy Screening (BHLS) is a self-reported measure that aims to assess particpants self-efficacy with three screening questions, such as "How confident are you filling out medical forms you yourself?" This measure was also used by Geboers et al (12,19). The NVS is a measurement tool that aims to capture patients' comprehension of health related information by asking participants to read and interpret a nutrition label and interprets how they make decisions (19). The BERMA is an additional self-report measure that aims to assess patient beliefs and self-efficacy regarding medication adherence and interactions within the health care system (19). REALM is designed to assesses medical term recognition and aims to capture HL by asking participants to pronounce a list of 66 common medical terms relating to wither illness or anatomy(19), Mayo-Gamble et al, additionally used REALM to measure HL in their study(11). Another study measured HL with the high blood pressure health literacy scale, a 43 item measure assessing print literacy and functional HL for blood pressure management, scores were summed, and higher scores indicated higher HL (8)A final study conducted by Cutilli et al,

studying HL and health disparities, measured HL with 28 questions regarding HL that were embedded in literacy tasks that focused on the following domains: clinical, preventative and health system navigation (20). The scores were then categorized according to the populations mean health literacy score which was developed by a committee (20).

Self-management and Health Literacy

Nine studies investigated the relationship of self-health management and HL. Three articles explored self-management in heart failure(7,10,16). Wu et al, found that patients with lower levels of HL had greater difficulty understanding, retaining, and implementing self- management instructions for heart failure at home (16). These patients were less likely to adhere to treatment plans, such as maintaining a low sodium diet, taking medications, and monitoring daily weights. Furthermore, patients with adequate HL had greater ability in learning how to self-manage their heart failure at home and were found to have decreased risk of hospitalizations and death(16). Moser et al discussed that as heart failure is complex, it requires adequate levels of HL and thus knowledge, skills, engagement and self- management to properly adhere to treatment plans (7). Morrow et al stated in order for individuals to have effective self-management of heart failure, this may rely heavily on adequate HL(10).

Two articles focused on self-management and inhaler techniques in obstructive respiratory conditions. Kiser et al tested the impact of a self-management intervention on inhaler technique for COPD and found regardless of adequate HL patients had improvements in inhaler technique (21). However, they described that COPD outcomes are impacted by literacy as patients with this condition are often prescribed several different inhalers and self-administration and management

skills of each is required to understand method and use for each (21). Federmen et al found that effective self-management was crucial in asthma control and that individuals with lower levels of HL were less likely to adhere to asthma medications and were found to have less effective self-administered inhaler techniques(15). They discussed that targeting adherence and inhaler technique may be a link in the relationship of low HL and adverse asthma outcomes, such as increased emergency room visits and hospital admission(15).

Kim et al developed and tested a high blood pressure (HBP) management program for Korean seniors that aimed to enhance self-help management skill for HBP over the course of 6 weeks (8). The intervention consisted of education and training on medical terminology, prescription medications as well as practicing communication with health care providers. Participants additionally had telephone counselling with registered nurses on HBP to encourage healthy behaviours and address any questions. The findings on this intervention were significant reductions in BP at 6 months and 18 months (8).

Ntiri et al tested a transformative learning (TL) intervention which is an adult learning approach first introduced by Mezirow. Individuals are self-directed in determining the information they need and now they may acquire it. They may be guided by others or use self-reflection to ask questions and determine why learning is needed to address a health concern. This method was used to foster curiosity on old and new self-management techniques of diabetes (9). They describe TL as a social process where individuals can add new meaning to previous experiences and use the expansion of consciousness as a guide for future action (9). After the intervention, scores of diabetes literacy and knowledge were increased, suggesting the use of TL principles in

health literacy education may be encouraged among individuals with chronic disease to seek knowledge that improves HL and self-management of their illness (9). Mayo-Gamble et al explored the association of individuals' HL and the ability to self-manage their medications (11). They found that individuals with limited HL faced challenged in both remembering to take medications and managing medication regimens(11). Verney et al discussed that previous studies that have implemented intensive self-management interventions, resulted in less emergency department visits, additionally that self and disease management interventions can reduce severity of targeted disease (13).

Interventions and Strategies to Improve Health Literacy

Eight studies included in this review explored interventions and strategies aimed at enhancing HL in older adults. Two studies specifically focused on strategies to address HL in heart failure (6,7). Wu et al tested a longitudinal study with an educational intervention that informed patients on escalating symptoms of heart failure such as edema and shortness of breath, that aimed to improve self-care abilities (6). Individuals in the intervention group had improved medication adherence, increased rates of daily monitoring of weight decreased health care utilization and increased patient satisfaction. Findings from this study suggest in order to combat age related disparities in heart failure, provide simplified health-related information and instructions that best accommodates patients level of HL(6). Moser et al followed rural patients with heart failure for two years and found inadequate HL was a risk factor for all-cause mortality (7). They discussed that majority of the resources for heart failure in hospitals and clinics are poorly understood and therefore are insufficient. They recommend collaborate communication with

patients with active conversation, rather than solely instructions, and ensuring word content is relevant to low literate patients (7).

A study implemented by Arnold et al provided education on colorectal cancer (CRC) and the importance of screening with fecal immunochemical test (FIT) (22). After education, participants were followed up via a personal or automated phone call providing educational and motivational message of the importance of CRC screening and repeating FIT instructions if needed (22). Results found having follow up with patients reminding them to complete FIT via either a personal or automated phone call increased rates of completing the screening test by 9% (22).

Kiser et al investigated a literacy sensitive intervention for inhaler technique in COPD, consisting of 30 minute one on one teaching, instructing a stepwise inhaler approach and teach back method (21). Results found that the intervention for inhaler technique can benefit individual with varying levels of HL, as scores for proper inhaler technique increased in low and higher literate participants. Additionally, they recommend inhaler technique teaching can be performed by physicians and physician extenders in office and outpatient settings (21). Kim et al conducted a multimodal high blood pressure management program over the course of 6 weeks (8). Participants received education on medical terminology, diet and medication adherence, instruction on skills for communicating with health care providers and home blood pressure monitoring and monthly counselling with community mental health workers for 12 months. The intervention group had significant reductions in blood pressure were found at 6 months and 18 months, as well as improvements in self-efficacy and high blood pressure knowledge(8).

For diabetes related management, Ntiri et al tested a TL intervention over the course of 3 weeks (9). The educational content focused on communication and information related to common diabetes topics such as: diet, exercise, medications, side effects and self-management. Although glycemic control was not increased post intervention, the scores of diabetic knowledge and health literacy scores were improved post intervention, supporting the use of transformative learning interventions in development of health education resources and materials (9).

Mayo-Gamble et al investigated the association between medication adherence and HL in older adults, and found individuals with inadequate HL had greater difficulty remembering to take medication, and recommend strategies to strengthen medication adherence should focus on enhancing HL (11). Another study by Cutilli et al investigated HL and sources of health information for United States older adults (20). This study found that most older patients who do not rely on the internet for information, seek health care information from health care providers as the main source of information, (20). They further emphasize, that health care providers should make health education a priority and should adjust strategies to best suit literacy level of older adult patients (20).

Future Research

All fifteen studies included in this review provided recommendations for future research. Two studies highlighted the need to further develop interventions targeting older adults that mitigate low literacy, improve health status, and reduce health disparities (13,20). Cutilli et al suggest when developing interventions, deliver resources and teachings in formats that are used by the media and health care providers to engage patients (20). Five studies recommend future research

may expand on interventions and strategies to improve HL in the varying health conditions: heart failure, COPD, asthma, and HIV (6,7,16,21). Moser et al suggest future development of interventions that strengthen knowledge and skills in management of heart failure, and test whether these interventions decrease mortality and increase health outcomes (10). Two studies undertaken by Wu et al emphasized the importance of interventions that diminish literacy related disparities in HF outcomes and when developing interventions the importance of considering varying levels of HL (6,16).

Kiser et al recommend investigating if interventions on inhaler technique can affect COPD health outcomes, such as ER visits, frequency exacerbations and mortality (21). Four articles recommend prospective studies explore interventions developed to enhance medication adherence (10,11,15,19). Mayo-Gamble et al suggest further exploring the provider assessment of patients health literacy before providing medication instructions (11). Gomez et al suggest future strategies for people with HIV that target medication adherence as well as numeracy and reading (19). Federman et al recommend future research in the development of education and interventions that promote medication adherence and self-management for asthma (15). And the fourth study with recommendations for medication adherence, was conducted by Morrow et al who studied correlates of HL in heart failure, and recommended investigating cognitive abilities and whether they may mediate the connection of HL and medication adherence (10).

Ntiri et al recommended future studies develop and test TL educational approaches for people with diabetes who are required to self-manage illness at home and make daily decisions (9). Geboers et al suggest that there is a need for future research on how social behaviours may

mitigate association between HL and health behaviours(12) . And finally, Nouri et al emphasize that work is needed to determine if low literacy interventions that are both linguistically and culturally appropriate can increase advanced care planning knowledge for vulnerable elder adults (17).

DISCUSSION

This scoping review summarized the extent of the literature regarding HL as a factor associated with health outcomes in older adults, and identified several evidence based strategies that address HL. A total of 15 articles met inclusion criteria and were included in this scoping review.

To date there is no consensus on the concept of HL, and across the globe there are over 250 definitions of HL that exist in academic literature(23). A common definition, that has been adopted by the Institute of Medicine and World Health Organization, defines HL as, “The degree to which individuals can obtain, process and understand health information and services they need to make appropriate decisions,” (24). The lack of a universal definition of HL, speaks to its complexity. HL is a multidimensional construct, generally composed of a set of skills, knowledge and ability required to manage one’s own health and navigate the health care system. Yet, the core elements and themes of HL vary across varying conceptual models in research (24). Some studies focus on literacy related skills such as reading, writing and communicating, others focus on the effects of sociodemographic factors such as age, culture, income, gender and race and the impacts those factors have on HL. The large scope of constructs encompassed in HL have been highlighted within this scoping review, where the included studies addressed: self-management, print literacy, communication skills, age, education, rural vs city dwelling adults,

social support, loneliness, medical instructions, resources, media and many other factors. The implications of HL as such a broad concept, poses a challenge for research to fully capture HL. Perhaps, addressing all concepts may not be feasible at once and when investigating HL, studies may have an explicit description of what aspects of HL they chose to investigate. Additionally, in the future coming to a consensus of what HL encompasses, may enable us to better operationalize the construct.

As there is no consensus on HL concept, there has not been a universal measurement system to assess HL. In this review, eight varying measurement systems were used to measure HL, and current data suggests that there are over 35 possible measures of HL(25). The NVS, REALM, S-TOFHLA and the high blood pressure measurement, were all instruments included in this review that relied heavily on an individual's ability to recognize, read, and interpret text. Measuring HL with solely print literacy skills is a limited approach to evaluating a large skillset (25). There is a need for a rigorous measurement system developed to capture and assess the broad range of skills encompassed in HL. Allowing for more accurate measurement of HL that captures skills beyond print literacy may be a step in the advancement of HL interventions and strategies and allow for reliable and accurate measures that detect change.

This scoping review sought to identify evidence based strategies that aim to address HL in older adults. This review identified interventions that improve HL in heart failure, diabetes, high blood pressure and respiratory conditions, however not a direct improvement in health outcomes. Additional strategies suggested health care providers prepare to be a main source of health information for patients, and to target increase medication adherence, interventions may tailor to

addressing patients HL. To date there are few evidence based practices, resources, and interventions, that have been found foster HL in older adult's long term. Furthermore, among in the interventions that do exist there are few studies that found an improvement in health outcomes. There is a need to further develop and test interventions that address HL in the long term and assess whether interventions have impacts on health outcomes. Currently, with such an understanding of the great impact of HL on health outcomes, health care providers should be conscious of a patient's level of HL when providing explanations, instructions and or diagnoses. Additionally, when developing interventions in the future, strategies may be developed in consideration with andragogical principles and methods. Constructing interventions to deliver teachings in ways that adult patients may learn best, may allow for improvement in HL in the long term.

There are several limitations within this scoping review. First, as English was the only language included in this review, studies that were excluded may have contributed relevant findings. Secondly, as the inclusion criteria for this review focused on studies conducted in Canada and the United States, research studies completed in Europe and Australia were excluded. These countries have contributed significant research on addressing HL as a tool to reduce health disparities, and relevant interventions and findings may have also been excluded. Although inclusion criteria for studies consisted of Canada and the United states, of all the studies that were screened and met inclusion criteria to be included in this review, were performed in the United States. The generalizability of the findings from older adults HL are limited, due to the significant contrast in health care systems of Canada and the United States.

Conclusion:

In conclusion, this review summarized the extent of the literature of HL in older adults. This scoping review found to date there is no universal definition of HL, and there are plenty of different measurement systems to assess HL. Additionally HL is a factor related to effective disease self-management. Finally, this review identified several interventions, that aim to increase HL, however more work is required to test change in HL and health outcomes in the long term. In the future, there is a demand for research to come to a consensus on the definition of HL, and measurement systems that assess HL skills accurately. Furthermore, continued development of strategies and interventions is needed, that aim to address HL in older adults and to test whether health outcomes are impacted.

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APPENDIX

Complete Search Strategy

Ovid MEDLINE(R) Epub Ahead of Print and In-Process, In-Data-Review & Other Non-Indexed Citations and Daily

#	Searches	Results
1	health literacy/	9924
2	functional health literacy.mp.	679
3	1 or 2	10155
4	aged/	3446071
5	(Mortality or Morbidity or life expectancy).mp.	1672325
6	health outcome.mp.	5461
7	5 or 6	1676829
8	3 and 4 and 7	130

Table 1- Summary of Relevant Findings

Author (s) Year	**Medical Condition**	**Study Design**	**Type of Practice Setting**	**Age Range**	**Report on Health Outcomes**	**Strategies to Improve Health Literacy**
Wu et al. (6) 2016	Heart failure	RCT	Outpatient clinics and hospital	Divided into two groups <65 and >65	Yes	Educational counselling on self-care and self-management of disease
Kiser et al. (21) 2012	COPD	RCT	Internal medicine practice	Mean age 63	Yes	Literally sensitive intervention on inhaler education with teach back method
Wu et al. (16) 2013	Heart failure	RCT	Cardiac clinic and internal medicine ward	61+/-13	No	
Kim et al. (8) 2014	Hypertension	Clinical Controlled Trial	Senior Centre	70.9+/-5.3	Yes	Weekly educational self-help intervention program
Moser set al. (7) 2015	Heart Failure	RCT	Outpatient clinic and hospital	63+/- 12.6	Yes	Creating education materials relevant to low literacy readers and collaborative communication with patients
Arnold et al. (22) 2019	Colorectal Cancer	RCT	Primary care clinic	50-75	No	Telephone follow up
Ntiri et al. (9) 2019	Diabetes	Cross sectional	Community Senior Centres	55 and above	Yes	Transformative learning principles to motivate knowledge searching
Morrow et al. (10) 2006	Heart Failure	Cross sectional	Community dwelling	47-89	Yes	Multimedia instructions for CHF
Nouri et al. (17) 2019	Chronic disease	Cross sectional from 2 RCT	Primary care and public health	Two groups 55+ and 60+	Yes	
Gomez et al. (19) 2023	HIV	Retrospective, cross-sectional study	N/A	50-79	Yes	Vance et al.'s multi-modal conceptual model of successful aging
Mayo-Gamble et al. (11) 2018	Not specified	Cross-sectional design Interviewer administered questions	Primary Care	60 and above	Yes	Foster development of HL in order to encourage medication adherence
Geboers et al. (12) 2016	Not specified	Prospective population-based cohort study	General Practioner office	65 and above	Yes	Encouraging health and social behaviours
Verney et al. (13)(2019)	Not specified	RCT	Not specified	65-95	No	
Cutilli et al. (20) (2018)	Not specified	Descriptive correlational study	Not specified	65 and above	Yes	Health care providers should prepare to be main source information for patients
Federman et al (2014)(15)	Moderate to severe asthma	Longitudinal design with interviewer administered questions	Primary care and pulmonary specialty practices	60 and above	Yes	