

Osteoarthritis 2050 projections and its multiple mitigation challenges

Abstract

Osteoarthritis is increasingly being shown to be an immense costly public health problem among the older population that is not readily reversed. This brief examines 2023 data to establish what is being advanced to minimize the projected osteoarthritis burden and why this topic remains of great import. Using the key word: Older adults and Osteoarthritis the PUBMED, PubMed Central, and Google Scholar were explored for current 2023 articles of relevance. These data, while not all encompassing, reveal there is an urgent need to go beyond downstream surgical and narcotic remedies for ameliorating osteoarthritis pain and towards upstream preventive approaches, including the parallel role of health literacy and exercise interventions and their adherence. However, multiple challenges clearly prevail in this latter regard that warrant ongoing attention.

Keywords: adherence, exercise, health literacy, older adults, osteoarthritis, prevalence, prevention, self-management

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Introduction

Current estimates of an immense emergent osteoarthritis burden exceeding one billion possible cases among older adults worldwide by 2050 have recently been predicted.^{1,2} An incurable and oftentimes progressive disease involving one or more freely moving joints, many older adults expected to suffer from this disabling joint disease will also be subject to additional suffering as a result of chronic health conditions that appear crucial to address, such as obesity.^{1,3} Yet, despite decades of dedicated research, little progress has been made in the realm of efforts to expound upon all possible disease correlates, as well as strategies that take the determinants of the disease into account and that can possibly help to reverse, prevent, or mitigate this disabling condition. Drugs for example may have modest to negative symptomatic effects but rarely appear to impact the disease process effectively, safely and directly⁴ and their efficacy is commensurate with exercise, deemed safe, in general.⁵ Surgery too, while often successful, is not always indicated or optimally successful in all cases, and is not an option in many developing countries, and among older adults with multiple health conditions, including frailty and cardiovascular conditions.

However, clinic based support for various forms of physical therapy and weight loss-where indicated⁶-that offer some hope for alleviating the burden of osteoarthritis suffering are often not readily implemented with fidelity or in a tailored manner or adhered to by the individual requiring this line of intervention. At the same time, since not all older adults suffer from this condition, and many who do, have but one affected joint, it seems that factors other than high age or genetics or obesity can provide universal explanations for this condition and why adherence rates to recommendations to exercise are often very low. Moreover, increasing evidence from preclinical studies show it is possible that early careful assessments as well as follow up tailored assessments and recommendations for self-management can help reduce this projected burden and commonplace expectation of an adverse health outcome.⁴ This paper presents a scientific rationale for efforts to improve nationwide understandings about exercise as an osteoarthritis preventive agent, alongside efforts to advance health literacy as well as provider osteoarthritis literacy in this respect that may be potent non biological disease explanatory factors in their own right.

Using the 2023 PUBMED database and others, the present scoping review provides a snapshot of how the theme of health literacy may be an important health determinant that can influence the ability of both healthy as well as impaired older adults to function as optimally as possible in a changing health care environment, predominated by high rates of chronic health conditions and limited health services, and treatment solutions that are often multi layered and complex.⁷ In contrast to other forms of literacy, a deficit in health literacy that speaks not to the ability to read or write but to the ability to comprehend and act on health messages accordingly, can surely limit the degree to which individuals can make active informed health decisions in the context of chronic illness self-management practices including the ability to cope with chronic illness challenges and to effectively carry out the many required adjustments that may be needed.⁷ This may further impact one's sense of independence, empowerment, and autonomy plus life satisfaction and outlook negatively and adversely.

Alternately, the ability to understand, and gather health associated knowledge and being able to act on this effectively, may enable more positive outcomes than not, or at the very least limit or avert negative preventable negative outcomes and situations. An adult with limited health literacy skills may also have fewer options for intervention if they cannot successfully navigate the health care environment, or have problems choosing from a menu of intervention options, as is often deemed to be of value. At the same time, they may be challenged in multiple ways when using the internet or instructed to do this. Evidence shows too that they may not be able to follow life-affirming prescriptions, and may feel ashamed or lack the skills to speak up for themselves.

Unfortunately, evidence shows, no matter where assessments are conducted, the required or desired level of health literacy that is demanded today to deal with chronic health conditions, in general, as well as that which is desirable in specific health contexts, such as osteoarthritis care, is not a given with most aging adults falling into the inadequate, problematic, or marginal health literacy category. This is unfortunate because those defined as having inadequate health literacy, have been shown in multiple ways to be more challenged in attaining higher levels of well-being, in general, compared to those with adequate health literacy.⁷ They may thus be at greater risk for injuries, being overweight, or sedentary than their healthy age matched

counterparts and more likely to be challenged in the context of efforts to minimize or prevent disability associated with obesity, diabetes, often found in osteoarthritis cases, if these prevail. Moreover, most older adults suffering from increasingly painful disabling osteoarthritis, and other chronic conditions may feel increasingly anxious, as well as powerlessness. At the same time, they may hold or continue to hold inaccurate normative beliefs and their ability to discriminate evidence based information from misinformation may be jeopardized.

However, as outlined in numerous studies, the role of health literacy as a salient health outcome determinant has often been ignored, rather than considered relevant in the process of developing long-term as well as short term self-directed health recommendations for the aging chronically disabled patient.

At the same time, several authors in the past and present have tried to uncover why exercise adherence rates are so poor among adults with one or more chronic illnesses, even though immense benefits have been demonstrated in response to regular physical activity participation in the presence of various prevailing chronic health conditions that are clearly progressive and debilitating. In continuing this quest, many current efforts are underway to more clearly understand what barriers exist to the achievement of one or more of these beneficial proven post-exercise health outcomes by the chronically ill individual, other than possible physical challenges.

This article was designed to provide the reader with a brief introduction to the concept of health literacy, and the specific rationale for considering health literacy as an important possible exercise moderator, thus a strong osteoarthritis determinant, that is likely to greatly determine the societal costs and others of the projected 2050 dire data predictions.

It was hoped that health care clinicians and researchers in the field unfamiliar with health literacy, as a potentially powerful health correlate, would have their awareness of this concept and its relevance heightened, and would consequently begin to consider utilizing this information for purposes of improving their clinical practices and research endeavours, with the aim of fostering more optimal osteoarthritis self-management practices than is currently observed, and in line with recommendations discussed by Hinman et al.⁸ It is clear that factors other than recommendation to exercise and alter behaviour are producing robust results and that other factors such as health literacy may be playing a role.⁹

Methods

To obtain the data for this review, the electronic data sources PUBMED, PubMed Central, and Google Scholar housing most of the world's peer reviewed medical data sources, were carefully searched using the key words Osteoarthritis and Older Adults/Health Literacy. The available reports that emerged were carefully scrutinized and from the broad array of available literature selected were the key themes of health literacy as an osteoarthritis determinant or intervention correlate with all forms of osteoarthritis being deemed acceptable. No systematic analysis was possible, and the reader is referred to those current reports of interest listed in the reference section of this report, and that are largely systematic reviews, not research studies per se. Herein only a descriptive overview and commentary is hence provided. Excluded were non English publications, and abstracts, and proposals for future study, but all research formats were deemed acceptable. Prior related information can be examined in the article by Marks¹⁰ on health literacy and osteoarthritis self-management.

Results

General findings

There were currently almost 6000 references listed using the key word osteoarthritis as of Aug 24 2023. In this regard, considerable attention is clearly devoted to uncovering signal pathways and molecular processes in advanced osteoarthritis that may lead to enhanced disease understandings.¹¹⁻¹⁴ However, while several suggestions for intervention to mitigate osteoarthritis are put forth, these are not well tested to date or emanate from animal models of the disease.^{15,16} Moreover, and consistent with many conclusions in the realm of intervention conducted to date, several recently published systematic reviews shows osteoarthritis rehabilitation interventions are only marginally effective and many studies may be poorly designed. In particular, small diverse samples, rather than large scale robust studies that can enable definitive answers to important genetic and epigenetic correlates of osteoarthritis and what should its prevention look like, fail however to often situate the condition in the context of the local overall joint environment and forces acting or failing to act optimally on the joint.¹⁷

Other reported perspectives include genetic based therapies and explanatory factors,¹⁸⁻²⁰ aspects of biomaterial development to treat osteoarthritis,^{21,22} such as collagen chondro protection^{23,24} and various lubricants²⁵ but few specifically account for the origin of the disease that is clearly quite diverse,¹ and may include vulnerability to excess stress as well as abnormal stress reactions that might be remediable, but may not be addressed by focal solutions or those that are not actionable or clearly understood.²⁶ In addition, biological cell based therapies that do not account for the overall environment of the damaged joint are also likely to prove suboptimal at best in clinical terms, no matter how carefully these are construed in the lab or tested on non-human samples.²⁷

Key findings

What does appear to be worthy of some thought and attention, are some of the current insights extracted below, such as Fry et al.²⁸

In this respect, Fry et al.,²⁸ highlight the key fact of great import advancing older adults well-being in that that whereas the ageing population is growing, the growing complexity and fragmentation of health care systems alone can confuse those who need the help, or fail to account for their limited ability to manage their health if they have challenges in understanding what they may need and why and how to seek help accordingly. They may also have challenges making health decisions such as choosing medications or following multi-pronged self-care instructions.²⁹ As Fry et al.,²⁸ specifically found the health literacy strengths and challenges reported by older Australians (people aged 65 or over) showed some with low health literacy scores to appear to exhibit higher levels of psychological distress. While this was not a prospective study, it was suggested attention to the prevailing health condition, or a combination of physical as well as mental health problems challenges being experienced was related to the ability of the older adult to employ health information and engage fruitfully and optimally with providers.³⁰ At the same time, the ability to navigate complex health channels speaks to a need for possible innovative initiatives to reduce the complexity of the health care system in its own right so it can offer hope rather than distress to many vulnerable low health literate older adults with poor reading, writing or comprehension abilities.

In another related report, Kim et al.,³¹ raised the issue that may be of increasing concern in that that this group noted older adults' with

low levels of digital literacy may not only have less access to health information, but may not be able to act on this to avoid any preventable negative impacts on their health, even though partially disputed by Pa-in et al.³² They may also experience anxiety in having to use technology, thus increasing their psychological distress, a predictor of poor health literacy in osteoarthritis cases.³² As per Suppiah et al.,³³ many today in the older age ranges may face one or more difficulties in reading, understanding, exchanging, and using health information and resources, and especially if social support factors are less than desirable.³² There may also be a mismatch between the various healthcare system demands needed to address their health issues, closures or service reductions, and long waiting periods post-COVID, and the prevailing health literacy of many older adults. Without efforts to ensure low literate older adults receive the support they need, their limited health understandings may well engender health outcome inequalities and access.³⁴

At the same time, practice guidelines for hip and knee osteoarthritis alone that consistently recommend clinicians implement exercise, education, and weight management, alongside consideration of non-steroidal anti-inflammatory drugs may prove very challenging too for an older adult who lives on their own in the community and has limited education.³⁵ A lack of consensus on some pharmacological options and adjunctive treatments further creates challenges not only for guideline adherence, but for examining any data that the older adult does want to evaluate. Moreover, health literacy as a topic in any form is only posted in five truly related articles on PubMed, the world's largest peer reviewed medical data base as of Aug 24, 2023 showing it has very limited influence when compared to the mainstream currently posted biological and epidemiologic data sets.

Yet as per Hunter et al.,³⁶ guidelines to encourage self-care in patients with symptomatic osteoarthritis must surely be impacted by the degree to which the affected adult is health literate and the appropriateness application of recommended management strategies. Those who are treating this group are thus encouraged to do so mindful of the health literacy levels, to ensure self-care is optimal and to be additionally mindful of the various skills needed to participate in telerehabilitation approaches, which may prove challenging and anxiety provoking, despite their value for some.³⁷⁻³⁹

In addition to accessibility and technical skills, while digital interventions have been employed recently to advance osteoarthritis care,⁴⁰ it is impossible to gauge if they would be helpful for an older adult with deficient health literacy⁴¹ as well as for those with poor digital skills. Even if used and somewhat successful, the problem of poor health literacy in other spheres cannot be readily overlooked,^{42,43} including its possible adverse impact on frailty,⁴⁴ obesity⁴⁵ and self-efficacy⁴⁶ as well as non-tailored health plans.^{47,48}

Discussion

Considerable research implies that adults with osteoarthritis who have poor health literacy may not progress as well as those with adequate health literacy. This may impact their ability or confidence to seek preventive care, follow guidelines, gain access to optimal care, and may be one factor promoting their tendency to become sedentary and/or overweight.

Moreover, since health literacy specifically influences one's behavioural choices, plus one's competencies to take action and to carry out decisions that can influence health outcomes, clearly those who are not adequately health literate may be less likely to feel sufficiently empowered to follow oftentimes complex treatment plans to maximize their health. These activities include exercise, diet,

getting enough sleep and controlling stress, among other behaviors, and all require some degree of understanding and an ability to carry these out safely.

Health literacy, a discrete form of literacy, denoting the ability to understand, act on oral, written, or electronically derived health information, as well as the ability to successfully negotiate the increasingly complex health environment and seek and utilize required resources, poses a challenge to many older adults, especially if they have to manage one or more complex chronic health conditions on a daily basis and their providers use medical jargon rather than simple language. Moreover, having low or marginal health literacy not only affects osteoarthritis self-care, but in all likelihood, daily management of one's overall health, including diminishing efforts to prevent health problems from emerging or spreading. Low health literacy is hence currently viewed as a highly important public health issue¹⁰ and key factor in health promotion efforts to attain a healthier society, in general, as well as a healthier outcome for all, even in the face of one or more disabilities.^{36,49}

However, in an increasingly technologically dependent environment, where many remain poorly educated, or do not communicate in the mainstream language, the literacy needed to decode health messages may be marginal at best. As well, given the nature of the medical model, and the increasing importance placed on self-management for fostering healthy outcomes, limitations in understanding, acting on, or navigating the health system are consistently predicted to yield more unfavorable health outcomes than not. This situation is not just a challenging academic puzzle or a theory to be proven, but a very serious pressing issue that may well exert undue suffering and immense societal costs in the realm of advanced countries as well as those that are less well-endowed,¹ for years to come, but is essentially preventable.

In this regard, the results of this brief albeit limited literature overview clearly show efforts to limit osteoarthritis suffering and its attendant problems are likely to fail if information delivery is suboptimal or non-existent. As such, it can be predicted that osteoarthritis prevalence as well as disability will be duly impacted and increase in multiple ways, rather than decrease without concerted timely public health initiatives and resources. Provider's efforts may similarly fail if their approaches remain too challenging for a majority of the older population who have health literacy challenges that cannot be readily reversed. In addition, even though citizens both healthy and otherwise, are currently expected to assume a highly active role in fostering their own well-being and in making health decisions, many confusing messages exist alongside compelling messages to use or engage in unhealthy advertised health practices. It is also apparent that individuals choosing to seek information or to respond to a provider's recommendation to do this must not only have the ability to conduct the search, but also the ability to synthesize and critically analyze the results of the information search and be able to personalize this. As well, they must be able to navigate diverse communication and be able to carefully select and process information among many competing approaches, including those from non-medical sources.

In this respect, providers are urged to screen for and assess their patient's health literacy before advocating any complex self-care approaches or solutions, or providing patient education or reading materials in all treatment spheres including surgery that take health literacy levels into account.⁵⁰⁻⁵³ Prospective patients may not actually realize they have treatable osteoarthritis, may have poor health decision making ability even if they do, for example they may believe surgery is the only remedy for them, even though first line approaches

have not been considered⁵⁴ and thus health status and outcomes may be more costly than not as a result of a failure to examine and account for health literacy challenges.⁵⁵

To solve this problem or at least attenuate it to some degree, the mandate for a system wide approach to overall health protection including public health messages pointing out osteoarthritis risk factors and early symptoms as well as opportunities for prevention and non invasive interventions may be helpful^{42,56} in general, as well as in regards to reducing osteoarthritis inequities⁵⁷ and costs.

However, without attention to the quality, credibility and readability, of any materials used for citizen or patient education purposes in any realm few advantages of high tech surgical and biological oriented interventions are likely to be optimally successful.⁵⁸ Moreover, limiting information overload is essential and what is offered should not confuse the older adult with too many technical terms and realms of discussion, but should be personalized and person centered rather than generic.⁵⁴ A role for improving digital literacy has also been stressed.

On the other hand a failure to address the dimension of health literacy insightfully and empathetically can surely foster:

- 1) Suboptimal health outcomes, especially those involving the patient's failure to follow instructions;
- 2) A patients' distress and dissatisfaction with the health care provider, plus multiple health costs and inequities.

Concluding remarks

In the interim, despite increasing efforts over time to conquer osteoarthritis, modern medicine has not been quite successful in this regard as of 2023. Indeed, it appears safe to say:

- 1) Osteoarthritis will continue to affect up to one billion older adults by 2050 especially if efforts to mitigate its onset and progression remain suboptimal.
- 2) In particular, a failure to advance health literacy from the earliest point in time is likely to increase this costly burden.
- 3) To minimize the risk of osteoarthritis disablement the importance of personalized and understandable high quality culturally specific health communications and public health messaging is imperative.
- 4) Training health care professionals including interviewing and basic assessment and listening skills and being able to provide understandable information that does not overwhelm and assisting with resources and navigation is essential.

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Conflicts of interest

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