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RISK OF FALLING IN THE ELDERLY: PREVENTION IS BETTER THAN CURE!

RISCO DE QUEDA NOS IDOSOS: MAIS VALE PREVENIR QUE REMEDIAR!

RIESGO DE CAÍDA EN ANCIANOS: MÁS VALE PREVENIR QUE CURAR!

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ABSTRACT

Introduction: The Episodes of falls in the elderly are considered a public health problem. Physiological, behavioral and environmental changes, such as architectural barriers, are the main factors of risk for the occurrence of episodes of falls within elderly. The objective of this study is to evaluate the risk of falls in polymedicated elderly people, aged 75 years or over, in a civil parish area of a Community Care Unit of the Central Alentejo Health Center Group.

Methodology: A cross-sectional, descriptive study with a quantitative approach was carried out involving 53 elderly people, to whom fall risk assessment instruments were applied, namely the Morse Scale and an observation grid.

Results: Of the population studied (N = 53), 33 elderly people had already suffered episodes of falls, the main reason being the imbalance. All seniors are polymedicated, taking at least 4 different medications per day. As for current health problems, the most prevalent are vision problems, high blood pressure, rheumatic diseases and hearing problems. In relation to the physical environment at home, there was the presence of numerous risk factors/architectural barriers that can potentiate the occurrence of falls as well as a lack of knowledge regarding them.

Conclusion: It is concluded that it is necessary to establish health-promoting community intervention strategies that contribute to the training and awareness of the elderly in the adoption of measures to prevent falls.

Keywords: Accidental Falls; Aged; Polypharmacy; Public Health.

RESUMO

Introdução: Os episódios de queda nos idosos são considerados um problema de saúde pública. As alterações fisiológicas, comportamentais e ambientais, tais como as barreiras arquitetónicas, são os principais fatores de risco para a ocorrência de quedas nos idosos. O objetivo deste estudo é avaliar o risco de queda em idosos polimedicados, com idade igual ou superior a 75 anos, numa freguesia da área de abrangência de uma Unidade de Cuidados na Comunidade do Agrupamento de Centros de Saúde do Alentejo Central.

Métodos: Foi realizado um estudo transversal, descritivo e de abordagem quantitativa envolvendo 53 idosos a quem foram aplicados instrumentos de avaliação do risco de queda, nomeadamente a Escala de Morse e uma Grelha de observação.

Resultados: Da população estudada (N = 53), 33 idosos já tinham sofrido episódios de que-

da, sendo o principal motivo o desequilíbrio. Todos os idosos são polimedicados, com pelo menos 4 medicamentos diferentes por dia. Quanto aos problemas de saúde atuais os mais prevalentes são os problemas de visão, hipertensão arterial, as doenças reumáticas e os problemas ao nível da audição. Em relação ao ambiente físico no domicílio, verificou-se a presença de inúmeros fatores de risco/barreiras arquitetónicas que podem potenciar a ocorrência de quedas, bem como um défice de conhecimento relativamente aos mesmos.

Conclusão: Perante a análise dos dados conclui-se que é necessário estabelecer estratégias de intervenção comunitária promotoras da saúde, que contribuam para a sensibilização e capacitação dos idosos para a adoção de medidas preventivas de queda.

Palavras-chave: Acidentes por Quedas; Idoso; Polimedicação; Saúde Comunitária.

RESUMEN

Introducción: Los episodios de caídas en ancianos se consideran un problema de salud pública. Los cambios fisiológicos, de comportamiento y ambientales, como las barreras arquitectónicas, son los principales factores de riesgo para la ocurrencia de episodios de caídas en los ancianos. El objetivo de este estudio es evaluar el riesgo de caídas en ancianos polimedicados, con 75 años o más, en una parroquia en el área de influencia de una Unidad de Atención Comunitaria de un Agrupamiento de Centros de Salud del Alentejo Central.

Métodos: Se realizó un estudio transversal, descriptivo, con enfoque cuantitativo, en el que participaron 53 ancianos, a quienes se les aplicaron instrumentos de evaluación del riesgo de caídas, a saber, la Escala de Morse y una cuadrícula de observación.

Resultados: De la población estudiada (N = 53), 33 ancianos ya habían sufrido episodios de caídas, siendo el principal motivo el desequilibrio. Todas los ancianos están polimedicados y toman al menos 4 medicamentos diferentes al día. En cuanto a los problemas de salud actuales, los más prevalentes son los problemas de visión, hipertensión arterial, enfermedades reumáticas y problemas de audición. En relación al ambiente físico del domicilio, se constató la presencia de numerosos factores de riesgo/barreras arquitectónicas que pueden potencializar la ocurrencia de caídas, así como el desconocimiento de las mismas.

Conclusión: Se concluye que es necesario establecer estrategias de intervención comunitaria promotoras de la salud que contribuyan a la sensibilización Y formación de los ancianos en la adopción de medidas de prevención de caídas.

Descriptores: Accidentes por caídas; Anciano; Polifarmacia; Salud Pública.

INTRODUCTION

Aging is currently a much-discussed and investigated phenomenon around the world. Life expectancy has increased since the last century due to numerous factors, such as low birth rates and fertility, decreased infant mortality, improved economic conditions, progressive changes in lifestyle, and improvement in health care, therapy, and support[1].

According to the World Health Organization[2], the proportion of people aged 60 or over is increasing. In 2019 this proportion corresponding to more than 1 billion. It is estimated that it will increase by 2030 to 1.4 billion and by 2050 to 2.1 billion.

In Europe, in 2019, the aging index was 134.7%, with Portugal being considered the second country in Europe with the highest aging index, corresponding to 161.3%[3]. In Portugal, according to the population census carried out in 2021, there are 2,424,122 elderly people aged 65 or over, which corresponds to 23.4% of the total population residing in Portugal[4].

The term aging is a word that is very familiar and very common to us, but it does not have a simple definition, since there is an infinity of definitions for it. According to Pinto *et al*[1], when we refer to the aging of human beings, it can be defined as the intrinsic process, where there is a progressive deterioration of the physiological function, an increase in vulnerability to injury, and a greater probability of dying.

The World Health Organization, regarding aging, mentions that *"at the biological level, aging results from the impact of the accumulation of a wide variety of molecular and cellular damage over time. This leads to a gradual decrease in physical and mental capacity, an increased risk of illness, and, ultimately, death. These changes are neither linear nor consistent and are only loosely associated with a person's age in years. The diversity seen in old age is not random. In addition to biological changes, aging is often associated with other life transitions, such as retirement, relocation to more suitable housing, and the death of friends and partners"*[2:s.p].

Falls are among the incidents that occur most frequently among the elderly population[5], as they are highly likely to suffer episodes of falls during the aging process, given the changes resulting from it.

According to the World Health Organization, cited by Gaspar *et al*[6], falls are considered a public health problem due to their high incidence, morbidity, and mortality, reduced functionality and hospitalizations in the population over 60 years old. These are the result of the aging process, in addition to behavioral and environmental factors[6].

In 2019, according to data recorded by the EVITA – Epidemiology and Surveillance of Trauma and Accidents system, most cases of domestic and leisure accidents assisted in emergency rooms in Portugal were falls (67.9%), with the most affected age group is the group of elderly people aged 65 or over and 48% of these falls occurred at home[7].

According to the World Health Organization[8], a fall can be defined as an act in which a person falls inadvertently on the ground or another lower level, leading to injuries that can sometimes be fatal. The elderly people are at greater risk of falling, which is partly due to the physical, sensory and cognitive changes associated with the aging process, in combination with environments that are not adapted to aging[8].

Gomes *et al*, cited by Miranda *et al*[5], refer that falls are defined as unintentional displacement of the body to a lower level than the initial position, without correction on time and are determined by multifactorial circumstances that compromise the person's stability.

The incidence of falls increases significantly with advancing age and, in elderly women aged 75 or older, the risk of falling is higher. This phenomenon can be explained by women's greater fragility, higher prevalence of chronic pathologies, medication consumption, and women's longevity compared to men[9]. Scientific evidence indicates that the consumption of four or more medications a day should also be considered a risk factor for falls in elderly populations[10].

Risk factors for the occurrence of falls may have a biological, behavioral, and/or environmental origin. There are usually two of these factors that interact to cause a fall, so prevention must take into account all factors since they are interdependent[11].

Thus, the fall is a multifactorial event that needs appropriate strategies for its indices to decrease. Intervention with elderly people and their family/informal caregivers is crucial, so this theme should be worked on through educational activities, highlighting the prevention of falls and the minimization of their complications. Nursing interventions should provide older people and family/informal caregivers with the necessary and appropriate guidance to prevent situations that may lead to falls, providing a better quality of life[12].

It should be noted that in 2021, the aging index of the municipality where the study was carried out was 248.8%[13], so we are facing a very aged municipality. It was also found that research on the prevention of falls among the elderly in this region is reduced. Thus, it was considered necessary to assess the risk of falls in polymedicated elderly people, aged 75 or older, in a community within the coverage area of a Community Care Unit (CCU) of the Grouping of Health Centers (*Agrupamento de Centros de Saúde* – ACeS) in Central

Alentejo and thus identify intervention needs in the context of adopting preventive measures for the occurrence of falls.

METHODS

A cross-sectional, descriptive study with a quantitative approach carried out in a community in the area covered by a CCU of ACeS Central Alentejo. Inclusion criteria were defined as elderly aged 75 years-old years old or over, polymedicated (intake ≥ 4 different medications daily); residing in a community in the area covered by the CCU, and enrolled in the Family Health Unit (FHU) in the area covered by that same CCU. As exclusion criteria, the elderly people included in the Integrated Continuing Care Team (ICCT) and elderly people without the ability to make free and informed decisions, due to cognitive impairment, were considered. Thus, the elderly people were selected respecting the inclusion and exclusion criteria, if they voluntarily agreed to participate in the project. The target population consists of 60 elderly people, and 53 agreed to participate. It should be noted that all ethical procedures were complied with, with the Declaration of Helsinki on Ethics in Research Involving Human Beings, after requesting the competent authorities, a favorable opinion was obtained from the Ethics Committee of the University of Évora (Opinion 21078) and the Ethics Committee for Health from the Alentejo Regional Health Administration (21/CE/2021).

The instruments used for data collection were the Morse Falls Scale – Portuguese version[14], an instrument used in the CCU, and the observation/analysis grid "Aging safely: preventing falls at home"[15]. To use the latter, an authorization request was made to the author, via email, and a favorable opinion was obtained.

The Morse Falls Scale (Portuguese version) is an instrument to assess the risk of falls in adults, classifying them into three different groups, according to the final score obtained (no risk, low risk, or high risk)[14]. The observation/analysis grid: "Aging safely: prevention of falls at home"[15], is an instrument that incorporates the following variables: sociodemographic characterization, characterization of current health status, mobility, and physical environment at home (identification of architectural barriers).

The data obtained were organized and analyzed using the IBM SPSS software version 24.0 (Statistical Package for Social Science).

RESULTS

Sociodemographic characterization

The data collection instruments were answered by 53 elderly people, of which 52.83% were female and 47.17% were male, aged between 75 and 92 years old, with an average age of 81.53 years old. As for schooling, 37.70% of the elderly participants cannot read or write; 9.40% can read and write but have not completed the 1st cycle of education; 49.10% completed the 1st cycle; 1.90% completed the 3rd cycle and 1.90% have a higher education. Regarding marital status, most elderly people are married or living in a de facto relationship (64.15%), with a considerable percentage of widows (32.08%) and 3.77% being single.

Regarding the question of whether they live with someone or alone, it was found that the vast majority of elderly people live with their spouse (62.26%); 20.75% of the elderly live alone; 13.21% live with their child; 1.89% live with their grandchild and 1.89% with their sibling.

Current health status

Regarding the amount of medication ingested, as previously defined, all elderly people take four or more different medications per day, the vast majority being antihypertensives and/or Central Nervous System depressants, which corresponds to 86.80%. As for diuretic drugs or those with a diuretic effect, 20.80% of the elderly people take them daily and 22.60% take medication that increases intestinal motility.

Current health problems can be grouped into vision problems (94.3%), high blood pressure (86.80%), rheumatic diseases (69.80%), hearing problems (37.70%), diabetes (28.30%), osteoporosis (15.10%), vertigo (15.10%), obesity (13.20%) and hyperuricemia (5.70%).

Of the 94.30% of elderly people who have vision problems, it was found that 86% use means to correct the vision deficit. Regarding the 37.70% of the elderly who reported having hearing problems, only 15% use a device to correct it.

Mobility

Of all the elderly participants, 45.30% reported having difficulty walking. Regarding the need to use walking aids, 39.60% of the participants reported using them. Of the elderly people who resort to the use of walking aids, it was found that 14 use a cane, 4 crutches, and 3 a walker.

Regarding balance, it was found that 52.80% of them need to lean on at least one of the armrests of the chairs to get up, and 50.60% report having balance problems.

As for the episodes of falls, 62.30% of elderly people have already suffered from falls. Of those who suffered episodes of falls, which corresponds to 33 elderly people, 7 fell once, 8 fell twice, 7 fell three times, 4 fell four times and 7 fell five or more times.

As for the time since the last fall, 9.10% of the elderly participants reported that it was less than a month ago; 21.20% reported having been in the period from 1 to six months; 18.20% mentioned that it was between 6 months and 1 year and 51.50% describe it as being more than 1 year ago.

The places where most falls occurred were in the backyard (42.42%) and on the street (21.21%) and the reasons that led to the occurrence of falls were imbalance (54.5%), tripping (30.3%) and dizziness (15.2%).

Regarding the need for hospitalization after falling episodes, 13.20% needed hospitalization due to resulting fractures.

Characterization of the physical environment

About the different divisions of the house and the presence of stairs and/or steps, a detailed analysis was carried out about the architectural barriers that could lead to a fall.

Analyzing the bathroom space, it was found that 88.70% have a rubber mat in the shower and 73.60% have a non-slip mat next to the shower. Regarding safety bars, in the shower, there are 15.10% of elderly people have them and next to the toilet only 3.80% have grab bars. About 94.30% of the elderly reported having easy access to towel racks and hygiene products. Regarding a fixed seat for washing feet, only 20.80% reported having one. About lighting, 96.20% mention having good light in the bathroom, but only 3.80% have emergency light. As for non-slip flooring, only 24.50% have it.

In the bedroom, 90.60% of the elderly reported being able to support their feet on the floor when sitting on the bed and 37.70% had furniture fixed to the floor. About 94.30% have access to a light switch without getting out of bed and only 7.50% have an emergency light in their room. Regarding carpets, 67.90% reported having carpets in their room and 5.70% had loose electrical wires.

Regarding the kitchen, 26.40% of the elderly mentioned that the cupboards are too high for them; 15.10% have non-slip flooring; 15.10% have carpets and all have good lighting. One elderly person (1.90%) has an emergency light in the kitchen and another (1.90%) reports having loose electrical wires.

As for the living room, all seniors reported having good lighting and no loose electrical wires or emergency lights. About sofas, 84.90% state that the sofas are soft and depressible and 92.50% have sofas with lateral supports. About 32.10% of the elderly have chairs with armrests and 35.80% have fixed furniture.

Regarding stairs and/or steps, 2 seniors reported not having them at home. Of the rest, 45.30% reported having a handrail, 94.30% had good lighting, 34% had carpets next to the 1st and last step and 62.30% had difficulty going up/down them.

Determining the risk of falling – Morse Falls Scale (Portuguese version)

With the application of the Morse Falls Scale – Portuguese version[14] to the 53 elderly people, it was found that 50.94% were not at risk of falling; 24.53% have a low risk of falling and 24.53% had a high risk of falling.

According to the analysis of the data resulting from the application of data collection instruments, it can be noted that the problem of falls in the elderly is present and that there are situations that enhance future fall events that can be prevented if measures are implemented promptly.

DISCUSSION

By analyzing the data, it can be seen that the target population is predominantly female (52.83%), a fact corroborated by similar studies carried out by Junior *et al*[16], where the female gender was 68.3%. , by Santos *et al*[17], with a sample of 63.60% of elderly women, and by Rodrigues and Alvarenga[9] with a predominance of 68.40% of the female gender.

As for education, 37.70% of the elderly people cannot read or write, results that were also found in studies by Santos *et al*[17], in which 34.1% of the elderly people were illiterate, and by Rodrigues and Alvarenga[9] in which it appears that 39% of the elderly participants were also illiterate.

Regarding marital status, most elderly people are married or live in a de facto relationship (64.15%). There was also a considerable percentage of widows (32.08%) and singles (3.77%), with results like the previously mentioned studies[9,17].

When analyzing the issue of sharing housing, it was found that most elderly people live with someone (79.25%) and 20.75% live alone. According to the study carried out by Rodrigues and Alvarenga[9], the vast majority of elderly people also lived with others (85.5%) and 14.7% alone.

The current literature has shown that several pathologies trigger or facilitate the occurrence of falls, such as rheumatic, neurological, and cardiac diseases[11].

When analyzing the health status of the elderly participants in the present study, it was found that 86.80% are hypertensive, 28.30% are diabetic and 15.10% have vertigo, facts that are in line with the study carried out by Júnior *et al*[16], in 10 health units, with a sample of 163 elderly people, in which it was found that 80.40% of the elders had cardiometabolic and/or respiratory diseases (which include heart problems, diabetes *Mellitus*, arterial hypertension, asthma, bronchitis, and respiratory failure).

Regarding osteoarticular pathologies, such as arthrosis, rheumatism, and osteoporosis, the same study[16] reports that 48.50% of the seniors reported having the same, which, in a way, supports the data obtained in the present study, since 69.80% have rheumatic diseases and 15.10% have osteoporosis.

According to the World Health Organization[18], from the age of 60, hearing loss, vision loss, non-communicable diseases such as cardiac and respiratory pathologies, and chronic pathologies such as dementia and cancer are more prevalent. According to Pinto e Silva[11] vision becomes less accurate and so does hearing, given that there is greater difficulty in hearing high frequencies. Thus, the reality identified in this study, in which 94.30% of the elderly people have vision problems and 37.70% hearing problems, cannot be ignored since we know that vision and hearing impairment interferes with the ability to calculate distances and perceive obstacles and alarms, which can lead the elders to fall[11].

Pinto and Silva[11] refer that all situations that lead to falls can be caused by taking medication, and special attention should be given to anxiolytics, sleep inducers, antihypertensives, analgesics, and insulin. According to the study carried out by Rodrigues and Alvarenga[9], 88.2% of respondents take medication daily. Therefore, considering that one of the criteria in this study is that elderly people take four or more different medications a day, this is, in itself, an important risk factor for accidents due to falls.

As for the specific groups of medication, it was found that the vast majority of elderly people take antihypertensive drugs and/or Central Nervous System depressants, which, according to Pinto e Silva[11], the ingestion of these drugs can lead to a fall event. Concerning diuretics or those with a diuretic effect, it was found that 20.80% of older people ingest them, which according to Berger & Mailloux-Poirier[19] can alter their mobility, causing orthostatic hypotension, a feeling of weakness and asthenia, which increases the likelihood of falls. In this way, it is proven that the groups of medicines that can increase risk situations for the occurrence of falls are present in the daily life of the elderly in this study.

Regarding mobility, 45.30% have difficulty walking and 39.60% use walking aids, 14 use a cane, 4 use crutches and 3 use a walker, a factor that also increases the risk of falling. According to Porto *et al*[20], the use of a walking aid device can help the elders in carrying out their daily activities, keeping them functional and independent, but all elderly people should be observed regarding the use of these devices, verifying whether the device is suitable, whether its use is correct, because if it is not, the risk of falling increases.

The study by Junior *et al*[16] shows that in the last 12 months, 31.30% of elderly people suffered at least one episode of fall, these data being in line with the studies by Santos *et al*[17] (15.90%) and Sousa-Araújo *et al*[21] (24.70%), demonstrating that the reality of the studied population is complex since 62.30% of the seniors have had between one episode and five or more accidents per fall, with 16 of these incidents occurring in the last 12 months.

When analyzing the place where most falls occurred, the backyard (42.42%) and the street (21.21%) were identified, a fact also verified by the study by Sousa-Araújo *et al*[21], which identifies the backyard as the space where 22.5% of accidents due to falls happen.

In this study, the reasons that led to the occurrence of falls were unbalanced 34%, tripping 18.90%, and dizziness with 9.40%. These data are in line with what was reported in the study by Sousa-Araújo *et al*[21] in which 53.6% of the elderly participants reported having fallen due to balance disorders and 17.2% due to dizziness/vertigo.

Regarding the need for hospitalization after falling episodes, of the 33 elderly people who fell, 7 (21%) were hospitalized due to fractures resulting from falls, a value much higher than that found in the study by Sousa-Araújo *et al*[21] which was found that 9.9% of the elderly people needed to be hospitalized and 2% underwent surgery due to fractures.

It was also found that some episodes of falling occurred inside the house. According to Pinto e Silva[11], the kitchen and bathroom are considered the most dangerous places, as they have slippery surfaces and sometimes poor lighting, becoming a trap for elderly people who have less strength and reflexes.

In this way, it became pertinent to evaluate the physical environment of the home, because as people age they need to live in environments that give them the necessary support to compensate for the changes associated with aging and that also give them security[11].

Regarding the results found in the present study, the presence of numerous environmental risk factors is notorious, namely in the bathroom, bedroom, and kitchen, such as the high number of elderly people without safety bars in the shower and toilet; absence of non-slip mats and non-slip floor; they do not have emergency light in the different rooms of the house; the high presence of carpets in the various rooms and also the absence of handrails next to stairs and/or steps.

According to the study by Santos *et al*[22], the places where the highest number of falls occur, in the bathroom, it is due to the lack of safety bars, non-slip mats, the presence of steps, and poor lighting. In the study, home visits were made to 18 homes, and it was found that:

- 14 had inadequate flooring for the elders to move around safely, 13 had inadequate bathrooms (irregular floors and carpets) and, concerning handrails, 10 homes did not have them next to stairs and/or steps;
- Regarding furniture, the presence of a poor distribution of the same in 9 rooms is notorious, as well as poor lighting.

These data corroborate the results found since we are facing a similar reality where environmental risk factors are present and can lead to episodes of falls.

Finally, analyzing the data resulting from the application of the Morse Falls Scale (Portuguese version)[14] it is verified that 50.94% of the elderly people do not present a risk of falling, 24.53% of the elders present low risk and 24.53% are at high risk of falling. In this way, and according to scientific evidence, some basic precautions should be implemented for all people, regardless of the risk of falling, and, in case they are at high risk of falling, an individualized care plan should be designed and implemented[14].

CONCLUSION

Population aging is a triumph of development and increased longevity is one of the greatest achievements of humanity, so it is necessary to analyze the challenges and needs that have arisen associated with aging, to promote health and quality of life of elderly people. Demographic changes worldwide bring new challenges to health professionals as they must quickly find strategies and answers that keep the elderly people as active elements in society.

The breadth of opportunity that comes with increased longevity depends on one key factor, health. If people live the extra years of their lives in good health, their ability to carry out the tasks they value is more positive than if these years are dominated by declines in physical and mental capacity, and have negative repercussions, both on a personal level, or for society[18].

The present study made it possible to assess the risk of falls in polymedicated elders, aged 75 years old or over, in a community in the area covered by a CCU of ACeS Central Alentejo, where after analyzing the results it was verified that they meet of the results of other studies already produced, namely, the high presence of risk factors for the occurrence of falls, whether at a biological, behavioral and/or environmental level, and also the high prevalence of falls – 62.30% – which corresponds more than half of the elderly people.

Therefore, given the above, it is imperative to work on this issue to prevent the occurrence of falls and their possible complications. Assessing the risk of falls in elderly people is essential to implement preventive measures and raise awareness among the population, so that these recurring events are not seen as a priority to be worked on only after the episode of falls, but in the sense of preventing them from falling. instruct and apply preventive actions, with the aim of preventing the occurrence of a fall, providing quality of life[12].

Thus, the need to define and implement community intervention strategies that promote health and prevent falls is reinforced, contributing to the awareness and training of the elderly, family and informal caregivers on this topic.

Health professionals play a key role in health promotion, as this will unequivocally bring greater autonomy and independence to carry out day-to-day tasks, greater awareness of individual responsibility in health promotion, with the adoption of healthy behaviors. We know today that users/families/communities that are more autonomous in their daily acti-

vities, through interventions such as health education, are more independent populations, with less demand for health care, thus reducing the impact and burden of the health system.

Authors' contributions

FR: Coordination of the study, study design, collection, storage and analysis of data, review and discussion of results.

MG: Study design, data analysis, review and discussion of results.

EC: Study design, data analysis, review and discussion of results.

AC: Study design, data analysis, review and discussion of results.

EM: Study design, data analysis, review and discussion of results.

All authors read and agreed with the published version of the manuscript.

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