



Review Article

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Type 2 Diabetes and Falls Linkages: Background, Implications, Associations and Future Directions as Outlined From 1985-2026

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Abstract

Diabetes prevalence, increasing rapidly among older populations, has many health implications including disabling orthopedic consequences. This brief specifically examines whether adults with type 2 diabetes are at increased risk for injurious falls, and if so, what preventive approaches other than medication are recommended. It also examines if a fall can engender a diabetic state in its own right. To this end, relevant literature located in key databases and published predominantly over the last 25 years using key words: falls and type 2 diabetes, among others, were sought and carefully examined. These data revealed: 1) There is a possible increased risk of falling in older diabetic adults with a type 2 diagnosis. 2) Falls fears may be a possible risk factor for type 2 diabetes or its exacerbation. 3) Controlling type 2 diabetes, as well as exercise and balance training, will likely reduce health costs and suffering attributable to injurious falls as well as recurrent falls among the elderly type 2 diabetic case. Indeed, falls injuries and diabetes related complications clearly remain an enormous public health concern and one that demands more current as well as future attention.

Keywords: Aging; falls; falls fears; injuries; intervention; type 2 diabetes; older adults; prevention

Introduction

It appears beyond dispute that falls are a highly common adverse event with serious health and social consequences especially among many older adults, as well as society [1-3]. At the same time, the number of older adults in any population is not only generally increasing worldwide [4], but is one that increasingly demands more autonomy as well as efficacious efforts to improve life quality. A related public health aim therefore is to assure successful aging for all, and in doing so to limit preventable health degrading situations such as falls. Unfortunately, the ability to effectively reduce the persistently high prevalence of falls among the elderly is limited, despite years of efforts to uncover its underpinnings and enact falls prevention endeavors [5]. However, the identification of remediable or changeable risk factors for falls that can be harnessed has opened the door to certain behaviors and beliefs

that might be addressed successfully in efforts to potentially avert or prevent falls among the elderly. Among these factors, behavioral and cognitive factors, visual impairments and sensory losses, inappropriate eyewear usage, psychoactive medication overuse, prevailing difficulties with gait and balance, comorbid conditions and being underweight or overweight with severe polyneuropathy appear highly salient as factors increasing falls rates in later life, rather than declining rates. Other documented risk factors for falls include physical inactivity, poor health and functional status [6-12].

Diabetes type 2, a common largely chronic metabolic health condition occurring more frequently among older adults than younger adults and one increasing in prevalence [4] is affecting millions of this growing cohort globally [13] is often linked to falls injuries, bone fractures, and signs of peripheral and central

neuropathy [3,14,15]. Based on what we know and the knowledge and information gaps here however, the condition is one that is not only possibly going to increase numerically, and possibly exponentially among the obese and/or frail type 2 diabetes case rather than not [4], but is likely to yield worse outcomes than those observed at present among adults who do not have this health condition [1,3,16-19]. As well, research reveals older people with type 2 diabetes especially those with functional impairments [18] are likely to have a 2.5 fold increased risk of incurring an injury as a result of a fall, as well as having a higher fracture risk [15,20] and state of dysmobility [21] in the presence of osteoporosis linkages [22] as well as possible obesity and sarcopenia and/or sarcopenic obesity and deficient vitamin D levels [12,22].

However, despite years of study and well documented adverse impacts of falls that ensue by older adults with type 2 diabetes, especially the highly disabling outcomes of multiple falls, preventive approaches to counter these likely events are rarely enacted. As a result, it is not uncommon to observe those who have fallen to exhibit the development of a reactive fear of moving and other pervasive immobilizing falls concerns. They may also encounter slow healing rates from both fractures and injuries, impaired mobility, and more so in the case of those who adopt sedentary fear evoked behaviors or responses [23]. In addition, in the case of the individual requiring surgery for a post fall fracture repair, their risk of infection is heightened considerably [1] along with a heightened risk of delayed optimal recovery trajectories. According to Crews et al. [24], the fact is that these older adults are prone to more severe problems and with poorer rehabilitation outcomes, even though bone density may be normal or high, those who sustain recurrent falls may find they have a diminished degree of perceived overall wellbeing and abilities to function physically and socially.

Problem Statement

Although falls injuries clearly pose a major threat to an older person's life quality, most articles on type 2 diabetes and its outcomes do not focus on this topic even though emerging evidence has suggested this may be of high relevance to many individuals as well as society. In particular, exposing aging adults with type 2 diabetes or the risk of an adult onset of diabetes to a comprehensive fall's prevention plan, as well as periodic screenings for any physiological changes that can heighten falls risk, such as gait challenges, is not a standard practice or a mainstream public health or medical strategy.

Rationale

Falls represent one of the most common preventable geriatric syndromes encountered in primary care and one or more impose a growing incalculable burden on many aging individuals, their families, and healthcare systems [2]. They are particularly likely to occur in the presence of type 2 diabetes, even though this may not be inevitable, but rather preventable, but are often ignored or undertreated or unrecognized. Indeed, from the multi factorial nature of falls in the elderly, it appears most of their specific causes can be traced to one or more chronic diseases such as type 2 diabetes, plus its neuromuscular associations, as well as the

impact of polypharmacy status, and various nutrition factors that can possibly be mitigated. Indeed, concerted prevention efforts can be hypothesized to markedly influence late life falls frequency rates and severity and their far-reaching costly implications and complications, including declines in strength, balance, and walking ability [25], and even death [26]. They must also contend with multiple health related issues related to type 2 diabetes at a time when they are aging and may be at high risk for poor health [25].

Aim of Review

While the most common risk factors for falls among healthy older adults also affects those with diabetes type 2, we sought to update what appears to have emerged as regards the specific risk factors occurring in the older diabetic case and if this warrants further attention or not. In addition, based on an understanding of the risk factors for falling, in general, plus those that are specific to those with diabetes type 2, documented strategies to avert falls and reduce falls risk among this population were sought. Diabetes type 2 and its consequences are often less well documented than those of diabetes type 1, but are costly in multiple ways none the less and are thus the focus of this commentary and overview.

Methodology and Approach

To gain some perspective on the state of knowledge in this regard and if more can be done to reduce the burden of falls injuries among older adults diagnosed as having type 2 diabetes, if anything, we conducted a comprehensive albeit selective review of related articles housed in the PUBMED CENTRAL, GOOGLE SCHOLAR, ACADEMIC SEARCH COMPLETE, and PUBMED computerized databases over an extended time frame of 40-45 years using the key words: falls, older adults, type 2 diabetes. In terms of the data collected, only those sources related to community-dwelling elders with diabetes type 2 were considered. Excluded were studies that took place in nursing homes or that discussed type 1 diabetes or pharmacologic management approaches, or genetic and biochemical mechanisms of pathology. The data including factors leading up to both type 2 diabetes as well as falls, falls outcomes, and preventive strategies against both health conditions were summarized in a narrative format designed to highlight the persistence and severity of this set of linkages despite years of study and largely widely reported preventable underpinnings. The term used here to describe what was previously termed diabetes mellitus was type 2 diabetes.

Overview of Findings

The aforementioned extensive search, while not necessarily inclusive of all related data sources and perspectives, revealed a considerable number of related papers over the years that speak to a clinically significant type 2 diabetes falls injury linkage among older adults, and when compared to the falls rates in the older non diabetic population [27]. Many articles also stress or focus on both the negative outcomes of this linkage, a strong need for solutions to minimize falls risk, as well as a type 2 diabetes risk among the elderly [28]. Several continue to provide both innovative and potentially feasible potentially impactful strategies including multi-pronged assessments, more physical activity and behavioral interventions.

Others focus on identifying risk factors for falls among the older adult population who suffer from type 2 diabetes, and which turn out to be numerous, but largely modifiable.

Among these multidimensional factors that reportedly raise the falls risk among diabetes type 2 sufferers are: a) The use of multiple medications, b) Excess muscle weakness, especially at the ankle, and c) A host of environmental factors, such as unattended icy sidewalks, in the winter. Others attribute falls to the presence of motor and/or sensory neuropathy, the use of insulin, vision impairments, and subnormal blood glucose levels [1,17]. Others reported as salient are low levels of physical activity, poor postural control [24], impairments in mobility [21] or balance [14,29]. As well, neuromuscular control deficits, diabetic foot ulcers [4], and high rates of body and foot pain, injurious psychotropic medications and polypharmacology are consistently implicated [24]. Mori et al. [12] add to these possible risk factors sarcopenic obesity.

Additional factors include:

- a) High rates of impaired vision [10,14],
- b) Lower limb amputations,
- c) Vitamin D deficiency or treatment with thiazolidinedione therapy [21,30],
- d) Impaired renal function [4] and sleep [31],
- e) Vestibular dysfunction [8,32],
- f) Inappropriate medication uses or the omission of indicated medication [33],
- g) Accuracy of self-perceived falls risk [34],
- h) Lack of awareness of falls and falls injuries [35].

Other late life health issues including dementia, urinary incontinence, depressive symptoms, and mild cognitive impairment may heighten diabetes type 2 falls risk, as may the consumption of high numbers of medications, poorer walking performance, and reduced cognitive function [14,27,36]. Diabetic neuropathy also associated with decreased bone mineral density may markedly increase the risk of incurring injurious falls and fractures [1,37] that may stem from the presence of reduced ankle muscle strength and its adverse impact on walking speed as outlined by Chau et al. [36] and where diabetic patients with extremely weak ankle dorsiflexor muscles are 3.7 times more likely to fall than those with more adequate muscle strength and who walk more rapidly. Other data imply a related role for reduced vibration perception [38], as well as the common problem of inconsistency shown in managing one's blood glucose level in many cases via its impact on dizziness, confusion, foot ulcers, and postural stability [24,39]. In addition, medications often used by this vulnerable group can heighten the risk for falls and falls injuries, including some types of antidepressants and axiolytics [30].

As well, a strong role is played by the presence of a decreased degree of sensori-motor function, and related musculoskeletal or neuromuscular deficits [24], the presence of foot and body pain, as well as proprioceptive complications. Additionally, there is some

concern that the use of offloading devices used to reduce the risk of foot ulceration may increase postural instability and thereby the risk of falling [24]. Oliveira et al. [40] who studied a convenience sample of men and women between the ages of 50 and 65 with and without type 2 diabetes found an association between hyperglycemic status and poorer mobility, with an increased fall risk even in younger patients and in those with a short disease duration, as well as postural control deficits in those with neuropathy [41,42].

Other injurious falls mediators include the presence of frailty [11], microvascular complications, retinopathy, altered body composition, cardiovascular disease, autonomic and peripheral neuropathy, use of medications such as thiazolidinediones [24,27], poor neuromuscular responses [44] and bone quality [20,43]. As well, high pain levels, high rates of medication usage, all forms of diabetes medication, lower strength levels, depression, and cognitive impairment are injurious falls determinants [24,27,45]. Ding et al. [46] propose kinesiphobia or the fear of moving that may be evoked by an actual falls event or even a perceived event should not be discounted here as this state may not only hinder exercise participation in older adults with type 2 diabetes, but their exercise participation rates, exercise self-efficacy beliefs, diabetes distress, and falls magnitude and risk. The failure to correctly perceive vulnerability to incurring a fall is also likely to prove harmful [34].

In both cases, and along with other modifiable factors depicted in Box 1 it appears those older adults with suboptimally efficient ankle muscle coordination when trying to balance should be targeted, especially where vision is impaired, diabetic foot ulcers prevail, and peripheral neuropathy where greater postural sway responses in standing or a slower than average gait velocity prevails [39]. Factors influencing the observed propensity for falling and sustaining non skeletal as well as skeletal injuries are numerous however, and include physical as well as cognitive factors as outlined in Box 1:

Box 1. Heterogeneous attributes underpinning falls risk in later life among type 2 diabetes cases

- a) Altered gait patterns/reduced toe obstacle clearance
- b) Balance disturbances
- c) Cardiovascular problems
- d) Diabetes medications [33,45]
- e) Depression
- f) Falls fears
- g) Frailty [47]
- h) Strength/proprioception deficits
- i) Hypoglycemia [48]
- j) Impaired cognition
- k) Impaired postural control
- l) Ischaemic cerebral events

- m) Low physical activity levels
- n) Medications that increase falls risk
- o) Muscle fat ratio alterations
- p) Peripheral neuropathy
- q) Reduced vibration perception
- r) Slow walking pace
- s) Use of insulin [47]
- t) Vision problems [10]
- u) Vitamin D deficiency [49]

Sample of Proposed Falls Mitigation Strategies

Among the many recommend efforts to specifically reduce falls events in type 2 diabetes cases, and in light of the multiple aforementioned falls determinants that may preside, a role for improving balance, strength, and gait, plus the use of new technologies such as virtual reality proprioception training has been advocated. In addition to possible generically oriented web-based interventions designed to reduce this risk among those with type 2 diabetes, designing specific interventions to target those physiologic functions underlying balance and gait control in the individual case is likely to be of high benefit [25]. In addition, customized footwear, such as athletic shoes that provide postural support and reduce slippage [24,33,50,51] plus efforts to measure the older adults' self-perceived assessment of their fall risk are recommended in the event of a fall or provider observed falls risk [34].

As well, specifically addressing the needs and concerns of those type 2 diabetes cases who present with static as well as dynamic balance problems, such as those with diabetic peripheral neuropathy, decreased sensory abilities, decreased motor skills, and decreased cognitive condition [15] plus muscle wasting [52] requiem attention. At the same time very careful medication management and regular medication reviews, testing gait speed and skill, as well as strength and tests of cognitive functioning are imperative. As indicated, this assessment process may best be, followed up accordingly by carefully selected balance exercises, general exercise programs, of adequate stress free rather than intense lengthy exercise bouts and cognitive training as indicated [14,36,50].

For those with type 2 diabetes and neuropathy the focus should be on maximizing muscle strength and vestibular competence, as well as visual competence [36] and that emphasizes the ability to cope effectively and safely in the context of activities of daily living as far as situations such as getting on and off an escalator, where somatosensory inputs may be suddenly altered. In addition to frequent medication checks, the careful control of glucose levels, especially helping the sufferer to avoid a hypoglycemic state of too little blood sugar, alongside depression and cardiovascular prevention/control, and fostering sleep health [27] are likely to be beneficial at reducing their falls risk [30].

The same benefits are likely to emerge as well from intensive lifestyle intervention efforts [19], Tai Chi or yoga practices [53-55], plus encouraging physical activity participation and thoughtful sedentary time practices [23]. Specific efforts towards minimizing pain, and poor proprioception [55-57] as well as aerobic exercise training, structured balance training [58-60], physical activity coaching and possible adjustment of exercises to account for the effort entailed in many cases [61,62], sarcopenic assessments, nutrition checks and sleep health counselling [31] are all reportedly likely to be of high unique or collective benefit as well.

Added to these ideas, Whelen and colleagues [63] propose the use of wearable digital health technologies designed to provide vital personalized timely behavioral and physiological feedback messages and directives. This can possibly maximize both the chances of collecting timely data that addresses falls risk indicators that may fail to be captured by periodic screenings alone as recommended [4]. The data can potentially provide for more tailored intervention plans that help avert the excess use of falls impairing medications [20,35] especially in those cases with neuropathy and poor balance [64]. Routinely recording measures of gait velocity and ankle muscle strength [1] in cases with type 2 diabetes is especially advocated as well [30].

In the interim, Lee et al. [65] who examined the use of whole-body vibration training in elderly patients with diabetic neuropathy, found significant improvements in the subjects' static balance, dynamic balance, muscle strength and blood glucose levels in the experimental group. The authors concluded that even a short term 6-week whole body vibration in combination with a balance linked exercise strength training program would probably be beneficial in improving these factors among similar diabetes cases at high risk for falls. It further appears that in those cases exhibiting a disease associated lack of adequate vitamin D and/or calcium, supplementation may assist in improving both bone health and resistance to fracture as well as muscle function and falls risk [20].

Another idea [66] stresses the need as well as the benefits of employing a frailty informed clinical decision framework that integrates functional status, physiologic vulnerability, treatment-related risks, and patient preferences among older adults with type 2 diabetes that is likely to enhance 'patient' safety and functional outcomes, rather than blood glucose HbA1c targets alone. This holistic approach builds on the idea that falls risk is multifactorial and in the context of the greater 1-year mortality rates of type 2 diabetes fallers may be favorably influenced by very careful physical therapy as well as well cognitive therapies and elimination of personal falls risk factors such as multi medication usage, falls fears, and hypoglycemia [47]. Here, potentially desirable strategies include: a) Cognitive behavioral therapy, b) Comprehensive falls risk assessments/follow ups, c) Falls prevention interventions as indicated d) Foot care. e) Medication monitoring, f) Strength/balance/gait training [15,64,67]. However, the fact nerve damage centrally and in the periphery may be present should be borne in mind and thus therapy may not work if this is non-specific and short term [67-69].

In this vein, Madsen et al. [41] favor the use of center of pressure gait assessments to specifically help identify type 2 diabetes cases at increased risk for falls, especially among neuropathic cases with elevated rates of diabetic foot ulcers, poorly controlled diabetes and balance, as well as leg muscle coordination deficits. The use of wearable technologies that can effectively detect and monitor subtle gait changes associated with the progression of type 2 diabetes appears worthy of consideration as well [42] for capturing gait variability, an emergent state often deemed closely associated with a prevailing cognitive decline, and one related to diabetes type 2 gait stability problems. Also discussed are interventions involving intentional weight shifting, manipulation of the base of support, and displacement of the center of mass such as tai-chi and yoga [70].

Practice and Research Implications

As well as gaining more factual data on the aforementioned type 2 diabetes falls linkages and ramifications, resolving or addressing the relative contribution of balance problems, vision deficits, frailty, efforts to control of blood sugar levels, and cognitions could allow for more targeted and hence potentially effective as well as cost effective approaches to achieving the goal of mitigating or preventing type 2 diabetes falling rates from occurring or escalating over time as is the current case [71]. More robust data may also help tremendously in anticipating as well as allaying fears of falling, functional limitations, possible weight gain and exacerbation of chronic health conditions, including bone density and muscle mass losses, and extent of depression and psychoactive drug use that can all heighten falls, fracture risks, and recurrent injurious events, especially in those with neuropathy [68,69] or who are deemed frail. More efforts too to educate diabetics as well as their healthcare providers about the dangers of falling and need for safe exercises to prevent this as well as to optimize bone health [73] could improve diabetes care and outcomes in all likelihood. The mode of delivery of diabetes type 2 management messages should also be studied to ensure optimal results and acceptability and a positive rather than a fear-provoking stance [74].

Those high age adults who use insulin as well as those who do not, those who are frail, and those who have fallen in the past year and exhibit balance and mobility limitations should be specifically targeted here [17,47]. To counter potential falls also indicated are careful periodic screenings, followed by tailored efforts to minimize any prevailing falls risk factors such as muscle weakness, neuropathy and retinopathy, poor balance, sensory disturbances, low visual acuity, and hyper or hypoglycemia states [74]. Team work and thoughtful client-practitioner communications and tailored plans as well as family support and health access are likely essential as well. To garner better understandings however, a research emphasis placed on identifying the temporal sequence of events that can unfold in type 2 diabetes cases other than those due to age and medication factors that can evoke multiple falls injury events in their own right are clearly indicated. Comparative and novel well-controlled studies that examine and test the role of diet and exercise, in this regard may also help to determine how to strategize so as to act effectively as well as safely and in a timely

carefully titrated way to minimize well proven deleterious costly consequences of failing to intervene thoughtfully and sooner rather than later.

Future samples must also be chosen randomly so as to represent the diverse aging populations, and one that accounts for socioeconomic factors, educational attainment, and health care access as well as the health beliefs of many older adults and practitioners. Moreover, samples studied must be followed for considerable periods, with the use of reliable and valid instruments. Data must also allow for generalizations, as well as for planning best preventable falls events practices, and that allow the clinician to more accurately pinpoint what the key treatment target[s] should be specifically. In the interim, advancements too are contingent on future research conducted on sufficiently powered sub-groups followed prospectively and that employ multi-dimensional objective measures and every effort to minimize bias. In the interim, it appears efforts to prevent falls through careful screening, followed by tailored efforts to minimize falls as well as diabetic extent and that focus on risk factors such as muscle weakness, poor balance, sensory disturbances, low visual acuity, and hyper or hypoglycemia are strongly indicated by most authors and should not be delayed.

Summary of Key Points

Despite many years of study, falls among type 2 diabetes cases remain a major public health concern among all aging adult populations, despite multiple programmatic efforts and research endeavors. Especially noticeable is the reliance on pharmacologic methods of treatment of the diabetes, but neglected here in our view is the highly salient knowledge of the key determinants of falls, among these being medication factors that contribute to or fail to address the many underlying non biological and remediable factors identified over time. Indeed, although extending literally over four+ decades the research base examined here does not yet permit any formal universal set of conclusions as to what specifically should be done to reduce falls events in the older type 2 diabetic sufferer, thus few well tested intervention guidelines or frameworks prevail to guide practitioners with any confidence.

Lacking here is clearly any consensus on the most salient explanatory underpinnings of falls events among type 2 high age adults, even though this clearly remains a high public health concern in most societies where aging adult numbers are rising as are high age populations suffering from obesity, frailty, and cardiovascular diseases. Without more refined study and stronger research undertakings falls are likely to continue to occur quite commonly in many aging persons with a type 2 diabetes profile, even though its antecedents appear largely embedded in modifiable rather than predetermined factors alone and especially among those with a neuropathy diagnosis. In this regard, it is evident this body of related research, while one currently of great import, is insufficient for offsetting a possible tsunami of poor aging outcomes in the future, including injurious falls and fractures. In addition, the omission of any related works that address the possible role and importance of patient education, health literacy, and social health

determinants in any meaningful way are rarely discussed, despite being strongly indicated.

Implications

Although research is costly, it is important to extend the current research base so as to address the overall topic more conclusively, and to clarify issues of possible relevance such as why in the case of older type 2 diabetic adult, some do not perceive they are at risk for falls even if they have fallen [72]. Since many falls experienced by cases with type 2 diabetes are determined by modifiable factors, addressing these systematically appears imperative. Indeed, it is safe to say that investments into more concerted efforts to raise the evidence base in this regard can offer a life of greater quality to many, while countering rising type 2 diabetic falls rates and excess disability increases. In particular, given the diversity among type 2 diabetic cases, more programmatic endeavors directed towards falls risk assessment and their value based on an ecological model perspective, as applied to the vulnerable geriatric population, are highly warranted to tease out and address the relative role of physical, biological, social, and mental health attributes that heighten the risk of a serious falls event in type 2 diabetes older adult cases as discussed by Bharti et al. [75].

Thereafter, working to maximize public health approaches as well as clinical, can be expected to help develop meaningful plans that may be adhered and that can secure the clients' personally desired life outcomes, their physical safety, falls self-efficacy and outcome expectations more ably than is observed at present. Those at highest risk who may be females, older than 75 years of age, with neuropathy and/or retinopathy [74], stroke histories [76], and orthostatic hypotension [4] or complaints [79], which causes dizziness [76] should be prioritized. In addition, those using psychotropic drugs and diabetes medications, especially those categorized as having a polypharmacologic history [80] who appear at high risk for falls should not be neglected [77]. Those with longstanding type 2 diabetes [20] and osteoporosis [43] or frailty histories who may incur fractures readily should also not be overlooked. Conversely, those less likely to fall are those with a higher appreciation of their fall's risk [74], higher balance and gait scores [4] and leg muscle strength [78], who are active, and who receive relevant prophylactic treatments [43], along with careful screening and follow up assessments.

In sum, falls in older adult type 2 diabetes populations that pose a myriad of adverse health outcomes are potentially remediable to a high degree and addressing these sooner rather than later will likely mitigate an otherwise highly probable downward health spiral for years to come [87]. In this regard, more conclusive surveillance studies, well powered and technology supported follow up studies of the trajectory of type 2 diabetes as this pertains to a high falls risk and adverse costly outcomes using optimal diagnostic instruments and carefully stratified samples that allow for sound statistical procedures to unfold are essential. Added to this are public health imperatives that stress the importance of falls prevention in older adult cases suffering from diabetes, and how being active alone can help.

Clinicians can help by considering the importance of falls prevention and not neglect to consider the import of:

1. Periodic falls risk assessments/referrals to experts as indicated [71,81].
2. Falls prevention education/interventions [35,74].
3. Frailty/obesity prevention [71,90].
4. Foot care as indicated [39].
5. Multidimensional exercise programs [82,84,88].
6. Nutritional education [26].
7. Optimization of glucose control in light of possible complications [83,85].
8. Vision deficit screenings.
9. Frequent medication reviews [33,35].
10. Efforts to reduce falls fears, sleep challenges, and depression [31,87,80].

More efforts by clinicians to identify the neuropathic type 2 diabetic case in this realm and its likely increased impact of muscle mass and functional losses, bone attrition, and recurrent falls risk is especially warranted [37,84,86,89-92]. In general, it is very important to consider physical therapies that can improve proprioception, muscle strength, balance, bone health, and walking ability, as well as pain, plus cognitive therapies that focus on moderating or eliminating mindless harmful repetitive behaviors and beliefs, immobilizing fears of falling, often not associated with diabetes distress, plus safety and non-adherence issues. Moreover, in cases with long-standing diabetes type 2 histories, those who are obese, those with cognitive or sensory problems other than neuropathy, those who exhibit bouts of hypoglycemia or depression and anxiety, plus those who are older than 75 and frail, and use multiple medications, should be assessed regularly and especially targeted to avoid the affected adult from experiencing a remaining life of possible functional dependence, unwanted health complications and costs, and even premature death [47,74,80,85].

Conclusion

Given that a significant proportion of falls that result in excess morbidity and mortality rates as well as demands on the health care system are observed among those with type 2 diabetes, a costly situation that is increasing, rather than decreasing, as well as debilitating and highly disabling, we conclude this topic must surely warrant more urgent and comprehensive attention. In the meantime, we further conclude, standard screening or ongoing monitoring as practices well as patient specific prevention strategies and action plans will likely be highly beneficial in reducing harm. Those type 2 diabetes cases in the higher age ranges, those who are frail, have multiple health challenges, and exhibit mobility limitations should be specifically targeted here without delay. Research design problems need to be addressed however, and must include high age adults and their voices, as well

as sound data collection methods, and clearly defined inclusion and exclusion criteria of representative samples.

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Conflict of Interest

No conflict of interest.

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