

Falls and Fall Prevention in the Elderly: Insights from Jamaica

Kenneth James

Jacqueline Gouldbourne

Chloe Morris

Denise Eldemire-Shearer

Department of Community Health and Psychiatry

Mona Ageing and Wellness Centre

University of the West Indies

Mona, Jamaica

Abstract

Falls among the elderly is increasingly being recognized as an issue of concern in both developed and developing countries. Falls in the elderly may precipitate adverse physical, medical, psychological, social and economic consequences. In Jamaica, there are no exhaustive studies or literature that have fully captured the epidemiology, aetiology or impact of such falls, though there is evidence to suggest that it is an issue that warrants some attention.

This paper, through the use of quantitative and qualitative methods sought to gain insights on the situation regarding falls among the elderly in Jamaica. Through literature reviews, canvassing of medical records, conducting focus groups and interviews, perspectives were gleaned on falls among elderly persons in Jamaica. Contributory and risk factors, and perceptions and costs were explored, as were any existing fall prevention policies or policy thrusts. The emerging picture is that falls are not a rare occurrence among older persons in Jamaica and extrinsic factors such as poor road surfaces, poorly constructed steps and poor design of public transportation vehicles etc. are factors that cause falls in the local setting. Similarly, intrinsic factors related to co-morbid condition such as hypertension, diabetes and sensory impairment appear to also contribute to increased risk of falling.

Further research on the issue is needed in Jamaica. So too are specific fall prevention policies and programs and actions to address prevailing concerns. Increased awareness of the occurrence of falls among the elderly and mobilization of efforts to decrease such events is needed, complemented by culturally relevant health education and promotion activities. Synergistic efforts of government, civil society, seniors and communities and households will be required for successful fall prevention. The time for planning and action is now.

Falls and Fall Prevention in the Elderly: Insights from Jamaica

Introduction

A fall can be defined as “unintentionally coming to rest on the ground or other lower level with or without loss of consciousness”. [1] Falls among the elderly remain an ever-increasing problem. Age-related changes and disease both have an impact on an older person’s ability to balance. Similarly, cognitive impairment, various medications, and changes in a person’s environment all appear to contribute to increased risk of falling. [2] Falls in the elderly are a public health and community problem with adverse physical, medical, psychological, social and economic consequences. These include disability and deformity, fear of repeated falls, curtailment of routine social activities, direct costs of medical care associated with injuries and loss of potential income.

Current literature suggests that the problem is of concern in both the developed and the developing world. In Australia it is estimated that about a third of the elderly living in the community experience at least one fall annually. [2] Gillespie citing studies from the USA corroboratively asserts that that more than 30% of people aged 65 or older living in the community fall each year, and that the risk of falling increases with age. [3] Statistics from Ontario, Canada indicate that one-third to one-half of persons over 65 are prone to falling, with falls being more common in older females. [4]

From the developing world, data are now emerging that suggest falls among the elderly is a growing problem and of significant public health concern. Falls in the elderly in China has been described as a very common complication in social life. [5] Based on a prospective cohort study in Hong Kong among older adults, the prevalence and incidence of falls were determined to be 19.3% per year and 270 per 1000 person-years respectively; with recurrent falls happening in 4.75% of Chinese older adults every year. [6] In Africa, one population-based survey from Tanzania that examined the injury morbidity in an urban and a rural setting indicated that among persons over sixty years old, falls accounted for about 35% of reported injuries in both settings. [7] In Latin America and the Caribbean, analysis of data from the SABE (*Salud, Bienestar y Envejecimiento en América Latina y el Caribe*) study on Aging, Health, and Well-being conducted in seven cities across the region, reported the prevalence of falls as varying from 21.6% in Bridgetown (Barbados) and 29% in Havana (Cuba) to 33% in Mexico City (Mexico) and 34% in Santiago (Chile). [8]

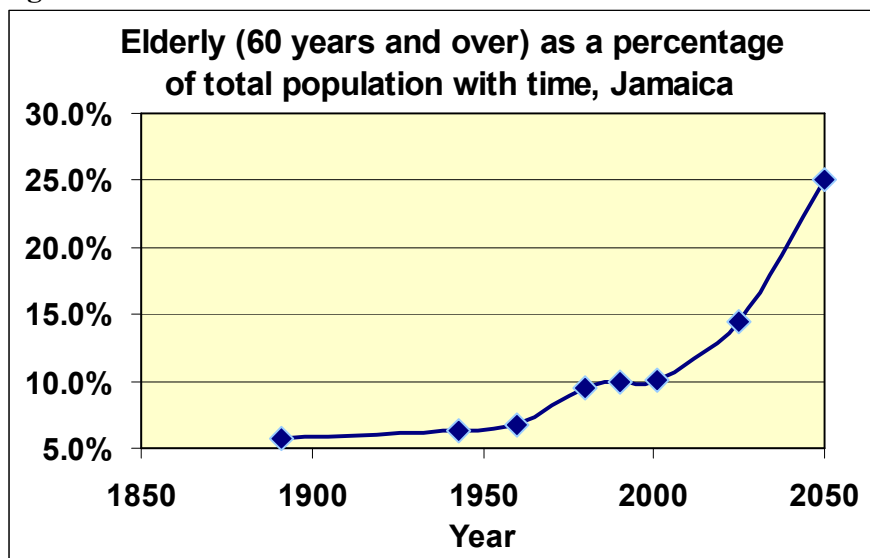
The number of elderly is increasing most rapidly in Asia, Latin America, the Middle East, and Africa. Developing countries will continue to experience rapid population aging in the coming decades and by 2025, there will be 839 million older people living in developing countries, 500 million more than will be living in developed countries. [9] Melton [10] has predicted that the aforementioned regions will account for over 70% of the 6.26 million hip fractures expected in the year 2050. Moreover, about 90 percent of hip fractures are associated with a fall, with the vast majority of such falls being from a

standing height or less. [11]. Consequently, there is increasing imperative to address falls and fall prevention among the elderly in developing countries such as Jamaica.

Background and Rationale

The Caribbean has been identified as the most rapidly ageing region of the world. Between 1960 and 1995, there was a 76.8% increase in the elderly population. [12] Among its regional island states, the average growth rate in the elderly population was approximately 5.3% for the 1995-2000 period. The elderly as a percentage of total population was 4.3% in 1950 and is estimated to reach about 15% by 2020. [13] In Jamaica, a similar pattern has been observed with a clear and rapidly rising trend in the elderly as a proportion of the population (See Figure 1).

Figure 1.



Constructed using data from <http://www.un.org/esa/socdev/ageing/workshops/vn/jamaica.pdf>

By 2025 as much as 1 in 7 persons will be elderly. Moreover, characterizing this pattern of increasing elderly is the differential growth rates within the various sub-age groups over age 60, with the 75 years and above age group expected to double moving from 2.8% currently to 4.0 % in 2025.

Concomitant with the increase in elderly as a percentage of the population has been the epidemiological transition where the leading causes of morbidity and mortality are no longer infectious in nature but reflect the rise and predominance of chronic diseases such as hypertension, diabetes and osteoarthritis. These conditions, are commonly known to increase risk of falling, providing further rationale for the assessment of, as feasible, the situation regarding falls and fall prevention in the elderly in Jamaica.

Aims and Objectives

This paper will focus on the situation regarding falls and fall prevention in Jamaica. Its primary objectives are to describe and review *as far as current documentation allows*:

- (1) the epidemiology of falls;
- (2) health service impacts and costs;
- (3) interventions and policies regarding fall prevention; and
- (4) to elucidate and illustrate the situation regarding falls and fall prevention in Jamaica through qualitative insights based on a number of case histories and observations.

Methodology

Anecdotal evidence suggests that falls in the elderly is prevalent. The extent to which the literature from Jamaica provides supporting empirical evidence is not fully known and is perhaps sparse. Consequently a collective decision was taken by the research team to employ a number of methods and strategies to provide evidence and insights regarding falls among the elderly in Jamaica. These included a search and review of existing literature, docket and patient information reviews, focus groups, interview with an expert and case histories. To this end, tools were designed to elicit information from focus groups, individual clients and patient records. The tools are attached at appendix 1-3.

Search Methodology

A comprehensive literature search was done. Scrutiny of articles from Caribbean and Latin American publications was conducted to ensure the inclusion of as many relevant published and unpublished studies and records that are pertinent to falls in the elderly. Searches on multiple electronic databases were done. These included Medline, MedCarib and PubMed. Internet searches, as well as manual checks of reference sections of review articles and studies published in the last ten years, including review of the published articles in the West Indian Medical Journal and the Post Graduate Medical Journal of the Caribbean.

Document Selection

Documents were screened to ensure appropriateness for inclusion in this study. The steps followed appear below.

Step 1: Identification of relevant documents

Documents were identified from the electronic data base that could potentially be used in the review. Duplicate studies were removed as well as studies unrelated to falls in the elderly (e.g., documents that referred to “fall” as a season or falls in children). To further ensure coverage of the topic documents related to trauma and fractures were also included to deduce how many of these are resulting from falls.

Step 2: Screening Based on Initial Inclusion/Exclusion Criteria

Studies located in Step 1 were screened based on inclusion/exclusion criteria, as outlined in the table below. All documents retrieved in Step 1 were screened based on title and abstract. Documents were omitted from the next level of screening if they failed to meet all of the inclusion criteria, or met at least one of the exclusion criteria (see Table 1).

Table 1: Inclusion/Exclusion Screening Criteria

Inclusion Criteria	Exclusion Criteria
1. Topic: Related to fall or fall injury	1. Studies that target children or youth
2. Age Group: Seniors (majority of participants 60 years or older)	2. Studies predominantly based on records of persons under 60 years of age.
3. Languages English	3. Records of trauma unrelated to falls.
4. Settings: Caribbean and Latin American based.	4. Studies based in other geographic regions.

All records and documents that met the relevance criteria were retained for the data extraction phase of the review process.

Review of patient/client records

To obtain clinic-based data regarding falls among the elderly. The records from a typical community health centre/ primary care clinic were reviewed. The docket and the summary diagnoses registers of patients attending the Social and Preventive Medicine (Hermitage/August Town) clinic between January 2004 and September 2006 were eligible for study. The clinic serves a catchment area with a population of 35,920 persons with the majority of communities falling in the low- to middle-income categories. The docket and records for the period covered some fifteen thousand, four hundred and fifty (15,450) person-visits. From these, docket of patients 60 years and over were selected and reviewed to ascertain whether the visits were in any way fall related. Additionally, from the summary daily register which records visits and diagnoses and which uses both ICD-9 and ICD-10 coding, all diagnoses related to trauma, dizziness/vertigo, hypertension, diabetes, cardiac disease, cerebrovascular disorders, epilepsy and arthritis were also selected for examination and the docket reviewed for any history of falls during the period studied. This approach was necessary since falls are not necessarily recorded as a diagnosis but may be included in the medical history as a presenting complaint associated with these primary diagnoses.

All relevant records were retained for the data extraction phase of the review process.

The Data Extraction Form (Appendix 1) was developed based on the researchers' knowledge of falls. The data extracted included information on medical history; date,

time and circumstances of the fall; type of injury resulting from fall; consequences and outcomes resulting from the fall, and where possible economic costs associated with the fall.

For quality control, two reviewers extracted the information for each document and compared results. Any differences were resolved through discussion. The data extracted were entered into a spreadsheet, analyzed and summarized with help of the software package, Statistical Package for the Social Sciences (SPSS version 12.0).

The research team also sought to complement its work by an interview with an expert physiotherapist who saw patients reporting for treatment and physiotherapy services secondary to falls. By reference to fall-related physiotherapy visits during the preceding 1 year period, the expert provided further opinions, insights and data, based on experience at the University Hospital of the West Indies, the leading tertiary care and medical teaching institution in the island. This activity essentially provided a perspective on falls in the elderly based on hospital outpatient derived data.

Focus Groups and in-depth Case interviews

To augment the quantitative data obtained from the literature review and the review of records, focus groups and case interviews were done. The focus groups sought to obtain information, opinions and perceptions regarding: characteristics of fall, intervention approaches, risk factors, outcomes of falls and prevention implications. The participants for the focus were recruited through the National Council for Senior Citizens which liaises with and works extensively with persons 60 years and over throughout the island;

and which also networks closely with government, non-governmental organizations and civil society on matters related to the elderly.

Four focus groups were held. The participants were selected so as to gain broad representation from the varying backgrounds spanning the socio-economic gamut found in the island. The focus group discussions were recorded, transcribed and the text read to familiarize the researchers with the content. Content analysis then ensued by identification of common themes and ideas expressed. These were then summarized and are reported in the results section of this paper.

In addition to the focus group, three in-depth interviews of persons who fell within the past year were done. This was done to further elucidate the situation regarding falls as in many cases, medical records were curt and without details about the fall itself. These case histories/in-depth interviews provided windows to the confluence factors that result in a fall, helping to illustrate ‘the pathway to falls’ and the contexts in which they occur.

In an attempt to address the issue of fall prevention policies and interventions, the research team enquired about any existing relevant national level documents. A review of the National Policy for Senior Citizens as well as the National Policy for Disabled Persons was conducted. In the absence of specific national policy directly concerned with falls and fall prevention among the elderly, these were deemed to be policy documents that might be relevant.

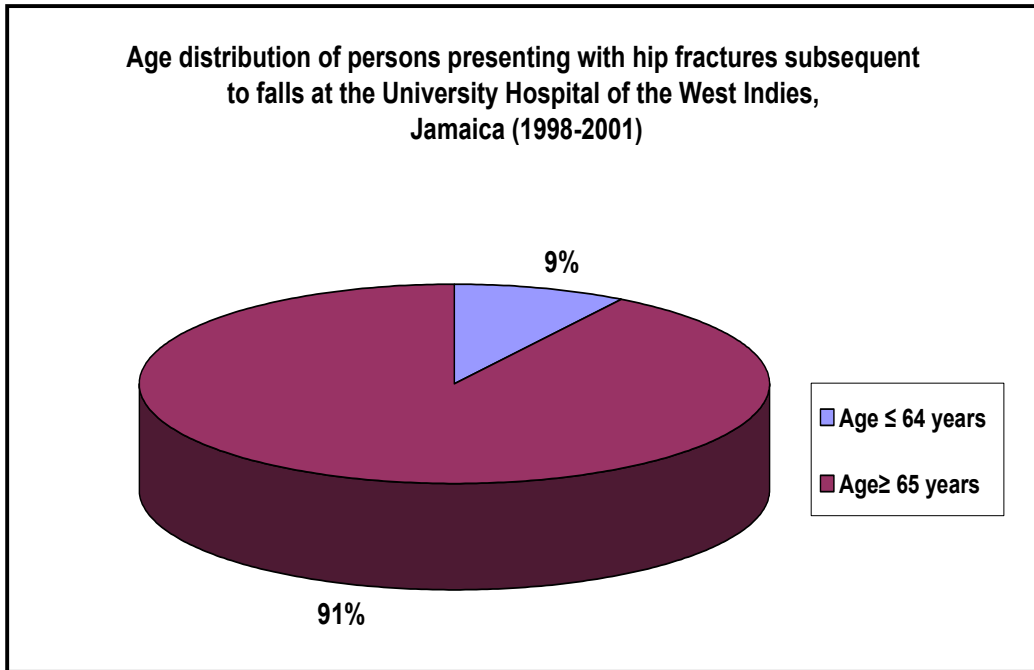
Results

From the literature search, two seminal papers pertinent to falls in the elderly in Jamaica, were identified. These were *Patterns of trauma injuries in rural versus urban Jamaica* [14] and *Falls: A modifiable risk factor for the occurrence of hip fractures in the elderly.* [15] The former study was conducted between March 1, 1998 and April 30, 1998 at the University Hospital of the West Indies (urban area) and at the St. Ann's Bay Hospital (rural area), among 974 patients and 458 persons admitted to the surgical services of these hospitals respectively. At these institutions respectively, 22% (185) and 19 % (101) of admissions were due to trauma, with elderly persons (60 years old or greater) accounting for 10.5% of such admissions. Additionally, data from that study indicate that falls was the second leading cause of unintentional injury accounting overall for 31.5% of unintentional injuries seen (26% at UHWI and 41 % at The St. Ann's Bay Hospital) . While the exact numbers and proportions attributable to falls were not disaggregated by age group in the data reported, the authors [14] highlighted the fact that **“falls were confined to two groups, the elderly who usually fall at home in urban as well as rural areas, and young children who fall from trees in rural areas”**. In recognition of the problem among the elderly, a public campaign to emphasize measures to provide a safer home environment and minimize the injuries sustained from falls was recommended.

Williams-Johnson, Wilks, and McDonald further illuminate the situation regarding falls among the elderly in Jamaica. [15] In examining the trauma registry records of the 152 hip fracture patients presenting at the University Hospital of the West Indies in Jamaica, between January 1, 1998 and December 31, 2001, they showed that in 90% (137) of

patients diagnosed with hip fractures, the precipitating factor was a fall. More strikingly, the overwhelming majority of these persons were aged 65 years-old and greater. The data on the distribution of falls by age group is displayed in the pie chart below (Figure 2).

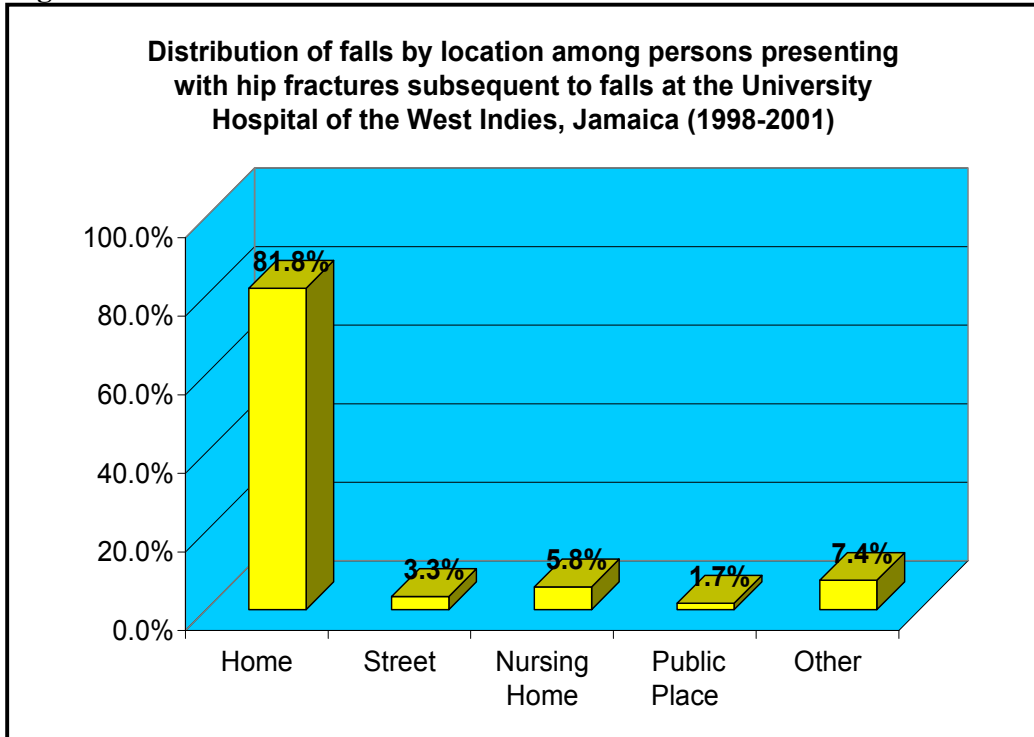
Figure 2:



Constructed using data from Williams-Johnson JA, Wilks RJ, McDonald AH. West Indian Med J. 2004 Sep;53(4):238-41.

With regard to the place of occurrence of falls resulting in hip fractures, for elderly persons 65 years-old and over, the home was the predominant location of the fall, implicated in over 80 % of cases. Figure 3 shows the distribution of falls by place of occurrence for the patients presenting with hip fractures.

Figure 3:



Constructed using data from Williams-Johnson JA, Wilks RJ, McDonald AH. West Indian Med J. 2004 Sep;53(4):238-41.

Interestingly “places of abode or residence” (i.e. home or nursing home) where it is likely that the majority of time in a typical day may be passed were specifically identified as the site of the fall (87.6% of cases). Among the elderly, further examination of factors within the home environment as well as personal medico-physical factors is warranted if the occurrence of falls among these persons is to be reduced.

In trying to capture the typology and aetiology of falls among older persons, various rubrics have emerged such as “accidental” and “non-accidental” causes. Increasingly studies [1, 16, 17] now classify the factors associated with falls/causes of falls as

“extrinsic” and “intrinsic”. Extrinsic factors or causes refer largely to environmental phenomena (e.g. rugs, floor surfaces, pathway obstacles, potholes). Intrinsic factors or causes on the other hand relate to age-associated physiological changes, disease or medications. Within the Jamaican environment, combinations of extrinsic and intrinsic factors contribute to the occurrence of falls.

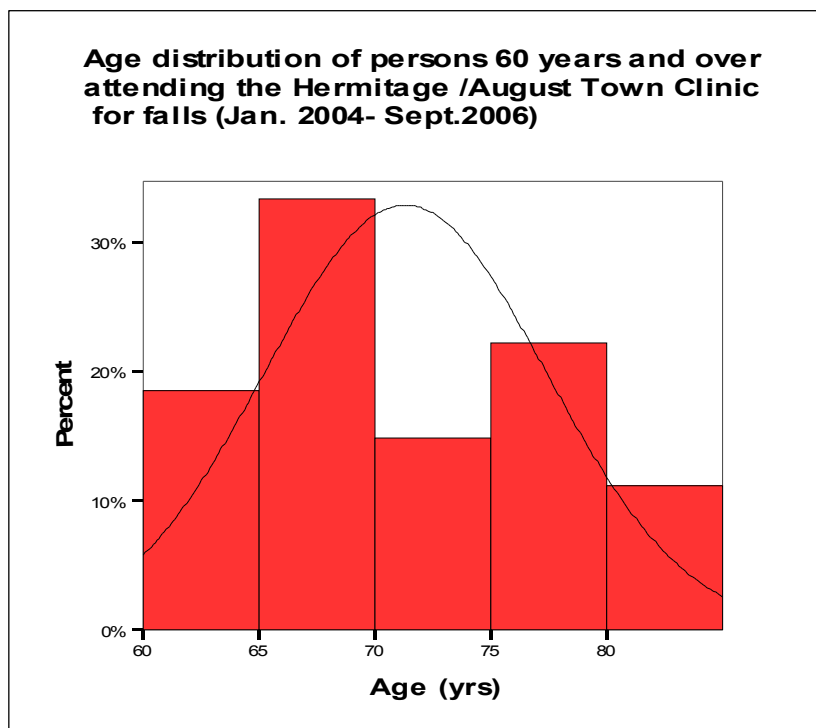
In the analysis of extrinsic factors associated with hip fractures most of which were due to falls and most of which occurred in elderly persons, the Jamaican data presented by Williams–Johnson et al [15] yields the following. Of 137 patients who fell, approximately 16% fell from a bed or a chair/stool, while about 8% tripped over objects such as boards, garden hose, slippers, loose carpet, and electrical wires. In of about 58% of cases, the location/activity associated with the fall was not stated. However, about 14% were associated with slips in the bathroom.

With regard to intrinsic factors, conditions such as hypertension (37%), diabetes mellitus (21.7%), chronic ischaemic heart disease (7.6%), dementia including Alzheimers disease (7.6%) were the main illnesses noted among the patients who fell. Less commonly reported were loss of vision in one eye, cataracts, and seizure disorders. [15] While no cause-effect relationship could be authoritatively established from the study, the co-existence of both intrinsic and extrinsic factors in the patients studied allude to the multi-factorial causation of falls and to the dynamic interplay of environment, physiological impairment, physical illnesses, and activities being pursued.

Review of Health Centre records: findings

Twenty-seven cases of falls were identified from the review of the records of 5412 person-visits by individuals 60 years and over to the health center during the 33-month period, January 1, 2004 to September 30, 2006. Among these 27 persons the age range was 61-82 years with a mean age of 71.3 years (s.d. = 6.1, median = 70 years). The age distribution is shown in Figure 4 below.

Figure 4



By gender, 66.7% of the cases seen at the health centre were females; males comprising the remaining 33.3%. This ratio is in keeping with the national observed pattern of utilization of clinic health services where 66 % of users are females.

Diagnoses, co-morbid illnesses and disability

Of the 27 files perused, 5 had a primary diagnosis of vertigo/dizziness of unknown cause, two -fractures; one-epilepsy; and two had the diagnosis of “falling”. The remaining 17 (63%) were listed as various cases of trauma or injury to the body parts.

Co-morbid illnesses relating to the fall or attendant in the persons who fell are displayed in Table 2 below. Diabetes and hypertension, hypertension and diabetes, hypertension with heart disease were the most common mix of co- morbid diagnoses.

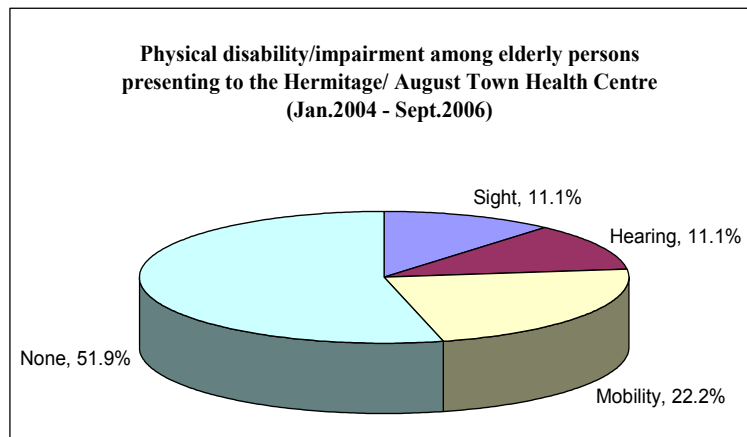
In fact, diabetes and hypertension were simultaneously present in 30.6 % of those elderly who fell; and either diabetes or hypertension was a co-morbid condition in 67.6% of fall cases presenting to the health centre studied. Overall, only in 14.8% of the fall cases studied, were there no documented co-morbid conditions.

Table 2. Co-morbidity among elderly persons who presented at the Hermitage/August Town health centre for falls (Jan.2004-Sept.2006)

Illness	Frequency	Percent
Diabetes	1	3.7
Diabetes & Hypertension	5	18.5
Diabetes & Hypertension, heart disease	4	7.4
Diabetes & Hypertension & mental illness	1	3.7
Diabetes & Hypertension & another illness	1	3.7
Hypertension	5	18.5
Hypertension, heart disease	3	11.1
Hypertension, heart disease & mental illness	1	3.7
Heart disease	1	3.7
Other neuro-psychiatric conditions	1	3.7
No co-morbid condition recorded	4	14.8
Total	27	100.0

Regarding specific physical disabilities and impairments, impairment of sight was noted in 11.1% of cases and a similar proportion had hearing impairment. Mobility problems were documented for 22.2% of elderly persons who fell. No disability or other physical impairment was reported for 51.9% of those elderly who fell.

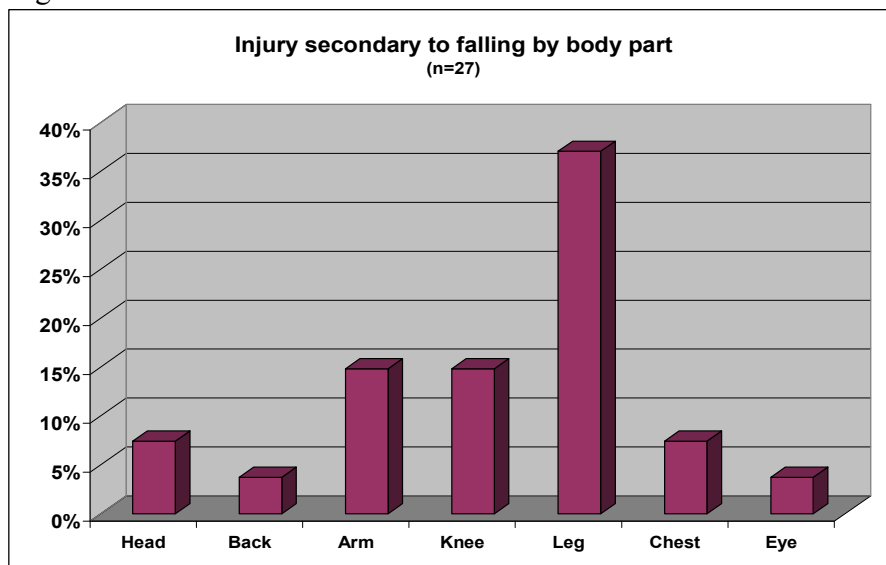
Figure 5:



Injury to body parts

The lower limb was the most frequently injured area of the body during falls (injured in 52% of cases studied). There were two head injuries and one eye injury secondary to falling. The bar chart below illustrates the relative frequency of the injuries by body part.

Figure 6



Place where the fall occurred

The place where the fall occurred was not recorded in most cases (~78%). In the few instances where this was recorded, places mentioned were the public bus, or in the home/yard environment (over a dog, at the gate, climbing stairs and inclines)

Consequences (medical) of fall

The immediate impact and consequences from the falls seen in health centre were laceration needing cleaning and dressing (85% of cases). These cases also complained of pain from tissue damage. For some patients the wounds resulted in difficult to heal, chronic leg ulcers requiring frequent cleaning and dressing at the health centre.

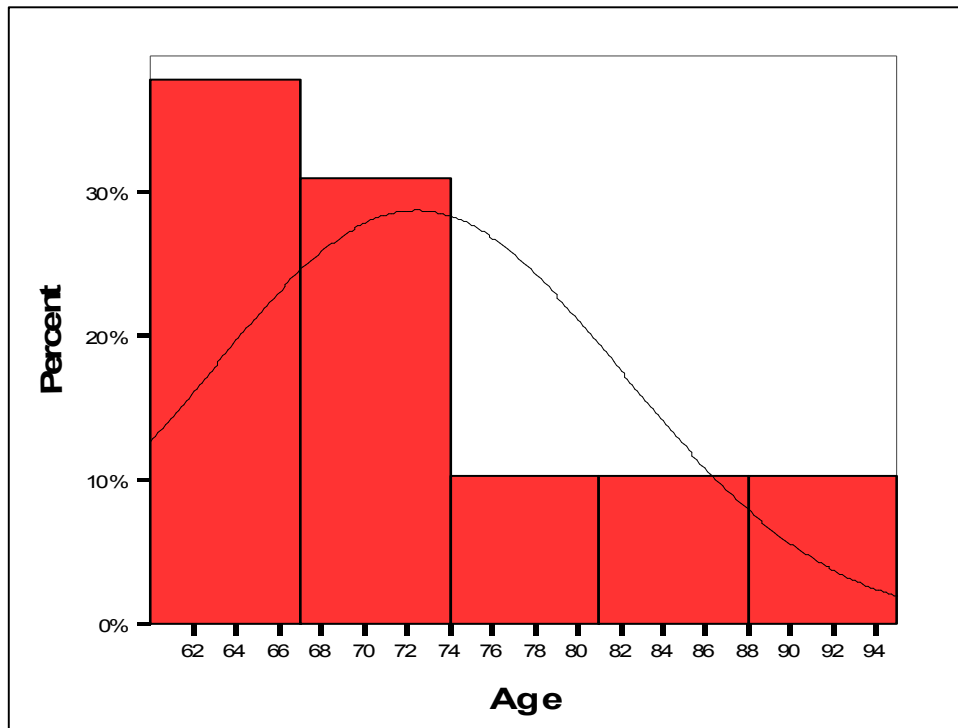
Insights from expert physiotherapist based on hospital outpatient data

Insights on elderly outpatients attending the physiotherapy department consequent to falls were obtained through the collaborative interview of an expert physiotherapist. This provided a window into characteristics of fall cases seen in a hospital ambulatory setting. This data further complements the hospital derived data gleaned from the literature and has the advantage of providing post-hospital discharge data where the consequences and impact of falls are further illuminated.

For the twelve-month period October 2005 to September 2006, twenty-nine (29) cases were identified from the outpatient physiotherapy department of the hospital. Nine (31%) were male and 20 (69%) were female.

Their ages ranged from 62 years to 94 years; the mean age being 72 years (s.d. = 9.7). As in the cases obtained from the health centre, the median age was also 70 years (inter-quartile range: 63-76). Figure 7 below is a pictorial representation of the age distribution of the cases seen at the outpatient physiotherapy department. The distribution reflected some skewness to the right, suggesting the median as the preferred measure of central tendency.

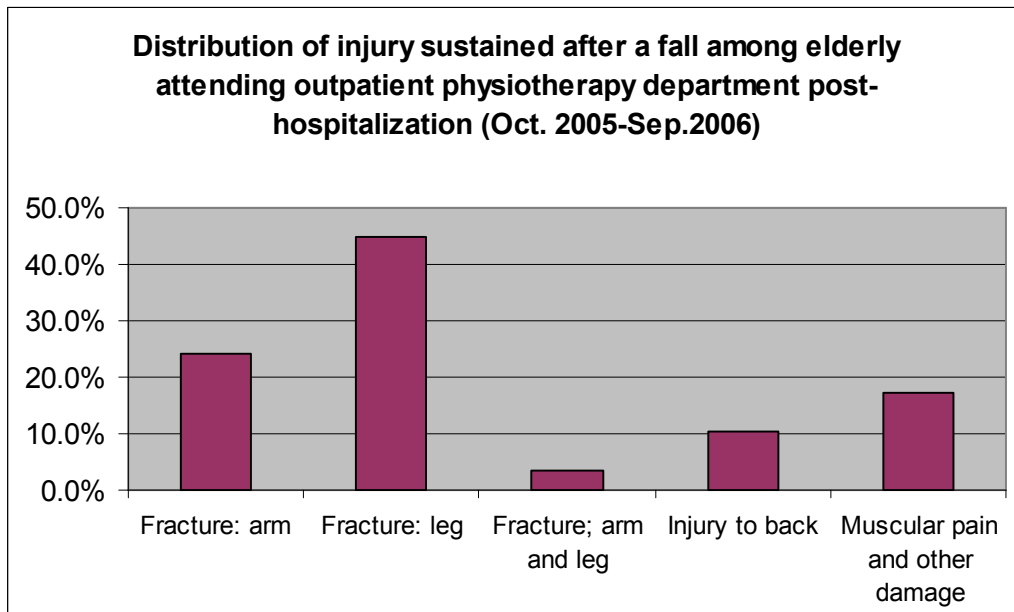
Figure 7: Age distribution of elderly patients seen at hospital outpatient physiotherapy department for falls (Oct:2005 –Sept 2006)



Injury following fall

The majority of patients (79.3%) seen sustained a fracture. Fractures of the lower limb were noted in 48.2% of the cases and fractures involving the upper limb occurred in 27.5% of the cases. In approximately one in six cases muscular pain and other damage was the main cause of referral for physiotherapy. The distribution of injuries is shown below in Figure 8.

Figure 8



Co-morbidity

Among those clients of interest seen for physiotherapy, diabetes mellitus and hypertension predominate as co-morbid conditions. This pattern was similar to that observed at the Hermitage August Town Community Clinic. Diabetes or hypertension

was a co-morbid condition in 51.6% of cases. Notably however, there was an increased prevalence of cancer (6.8%) among these elderly who fell and were seen for physiotherapy in the hospital outpatient setting as compared to those seen at the health center level. The finding is not surprising given the somewhat different and more severe morbidity that would be expected among those who had been admitted to hospital vis-à-vis clients obtained from a community clinic setting. Table 3 captures the distribution of attendant co-morbid conditions.

Table 3: Prevalence of co-morbid conditions among elderly patients experiencing falls seen at outpatient physiotherapy department (Oct. 2005 – Sept. 2006) [n=29]

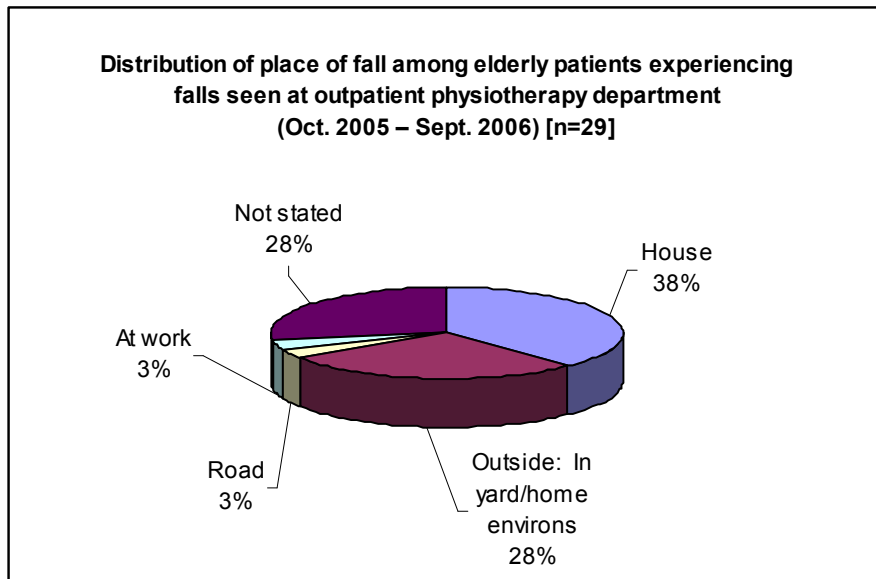
Co-morbid condition	%
Diabetes	3.4
Diabetes & Hypertension	10.3
Diabetes, Hypertension & Heart Disease	6.9
Hypertension	20.7
Hypertension & Heart Disease	10.3
No co-morbid condition documented	31.0
Asthma	3.4
Cancers	6.8
Gastric ulcer	3.4
Scoliosis	3.4
Total	100.0

Place of fall

Figure 9 displays the pattern of falls by place. The house was the most frequently documented site of falling accounting for 52% of the location of fall *for those persons for whom site was recorded* and at least 38% overall of the falls among the clients studied.

Twenty-eight percent (28%) cases said they fell outside within the yard or home environs while only 3.4% of falls occurred at work. In 28% of cases the site of the fall was not recorded.

Figure 9:



Consequences (medical) of fall

The majority of persons, 66% (19), suffered marked immobility from the injury they sustained when they fell. This immobility coexisted with severe pain. One person who worked full time work was medically unfit to attend work for some days. All other persons were retirees.

Persons who fell and sought attention at the hospital underwent a variety of medical treatments and procedures. All cases had radiological investigations (X-rays) of the

injured areas. Sixty-two percent (18) of the cases had surgical operations done. In a minority of instances (10.3%), CT scans or ultrasound investigations was required. All cases subsequently attended orthopaedic and physiotherapy therapy clinics. The number of visits made by the clients reviewed ranged from 1 to 24; the median number of visits being 4 (inter-quartile range: 2.75 – 8).

Health impact and social/economic burden of falls

The impacts of falls among the elderly are manifest in a variety of ways. It is useful to recognize that falls among the elderly not only incur direct cost clearly associated with the falls, but also indirect costs and intangible costs. Direct costs include those associated with the cost of medical care. Indirect costs include: the loss of income and productivity associated with the fall, those of absenteeism from work, and losses from disability. It is important to note that even though many elderly are retired persons, they continue to be productive citizens contributing economically through self-employed activities, agricultural endeavours, and their roles in many households as caregivers, and grandparents. A fall of an elderly person can thus result in significant indirect costs. Additional indirect costs include those of increased insurance premiums as well as those of increased payments to beneficiaries when an insured person is injured. Intangible costs occur due to pain and suffering or due to fear of falling again. This can disrupt the normal routine and social activities of older persons. Falls among the elderly may necessitate a disruption role changes that can negatively impact a family or household.

While the indirect and intangible costs are difficult to measure, preliminary insights into the direct cost of falls can be gained by examination of the data presented below in Table 4. The data was obtained through information gleaned from patient records studied from the community clinic (health centre) and those from the physiotherapy outpatient clinic supplemented by case interviews with persons who had fallen and utilized these services.

Table 4: Minimum estimates of economic cost of falling in clients studied

Procedure	Minimum costs	# of Health centre cases utilizing procedure or service	Total (Jamaican dollars) [®]	# of Physiotherapy cases utilizing procedure or service	Total (Jamaican dollars) [®]
X Ray	\$1,500.00	15	22,500.00	29	43,500.00
CT Scan	\$12,000.00			1	12,000.00
Ultra Sound	\$4,000.00			2	8,000.00
MRI	\$50,000.00			1	50,000.00
Surgery	\$20,000.00			18	360,000.00
Dressings	\$ 200.00	27	5,400.00	18	3,600.00
Health centre visits	\$ 100.00	27	2,700.00		
Physiotherapy	\$950.00 [^]			114*	108,300.00
Out Patient Clinic	\$500.00			7	3,500.00
Accident & Emergency	\$500.00			29	14,500.00
Pain Medication	\$500.00	27	13,500.00	29	14,500.00
Antibiotics	\$1,000.00	27	22,000.00	23	23,000.00
Total			\$66,100		\$626,400.00

[^]Represents the weighted average of a first visit of \$2000 and 3 follow-up visits of \$600 (recall typical number of visits = 4)

* represents no. of *person-visits* for physiotherapy services

[®] N.B. To convert costs into US\$, divide by 66. [\$1US = 66 Jamaican dollars (J\$)]

Table 4 highlights some major costs borne by patients as a result of the fall they sustained. It is a rough estimate of the some of costs incurred. It is important to note that room and board are not included and other incidentals that are inevitable with hospitalization are not included (as these were not readily available). Health centre visits, outpatient and orthopaedic clinic visits are calculated based on a minimum of one visit only. As such these summary cost are minimum preliminary out of pocket expenditure estimates and will under-estimate true costs. Additionally, a substantial portion of the true costs is borne by government under its current cost-sharing schemes.

Based on the above figures with regard to falls, the mean minimum out of pocket expenditure for those presenting to the community clinic was J\$2,448 and that of those seen by patients at the hospital outpatient physiotherapy clinic was J\$21,600.

The average pension disbursed per month to beneficiaries of the government's national insurance scheme is about J\$6,105.00 per month. Medical bills associated with a fall thus may consume about 40% of pension for patients seen at the community clinic. For those who utilized hospital services, payment of associated bills may constitute about 30% of annual pension. Among the elderly who may have other concurrent chronic disease, fall exacerbate the economic burden of medical costs.

Focus Groups Results

Information was gleaned from four focus groups discussions; each with 8-10 persons.

Profile of the groups

The focus group participants were between the ages of 60 and 85 years. The groups represented a mixture of persons from all socioeconomic and educational strata. Their occupations included educators, health care professionals, casual labourers and sports professionals. They were all retired but kept busy with volunteer work. Some were still occasionally employed. On average, the gender mix was 65% female and 35% male.

The focus groups yielded information on places of fall, impact of fall and fall prevention strategies. The results are as follows.

Experience with falls

In response to queries about experiencing a fall in the last few months, most persons reported either falling themselves or knowing some older person who had fallen in the last few months. This was for example expressed as “I fall down every time; they call me ‘Miss Fall Down’ ” and “I have friends who fall down very regular”. Some participants noted physical injuries resulting from falls as exemplified by the statements “I fell down and broke my leg” and “Fell at home and hit my shoulder”

Causes of falls

On exploration of perceptions of causes of and contributory factors to falls, a myriad of answers emerged. These included poor lighting on the street, holes and puddles in the roads and sidewalks, uneven pavements, sidewalks cluttered with roadside vendors and their ware and merchandise. Stumps remaining from incompletely removed road and sidewalk signs were mentioned with angst as causing persons to trip, stumble and fall. “Puddles and large pot holes in the roads, we have to jump to avoid the water and then we fall down” and “Vendors on sidewalk as so we have to walk in the roads” are quotes that illustrate the feelings of focus group participants.

Focus group participants also demonstrated an awareness of medical conditions contributing to falls - “High blood pressure threw me down one time” and “Vertigo, our head starts to spin and then we fall down”. Simultaneously, persons alluded to the ageing process as having a role in precipitating a fall. “We just fall down, I guess that is what happens when you get older; there are no reasons” quipped one participant. Another noted. “I was going home. I have 18 steps and while going all of a sudden I notice I just fall down going down all the steps.... I did not feel dizzy, not feel sick nothing. They said the blood pressure was fine.... I cannot say what happened why I fell.” - suggesting that falls may be of unknown medical cause.

The poor design of buses used for public transportation was mentioned as worrisome issue. “There are not enough seats on the buses and so we fall down because we have to stand and cannot hold on properly”. “The steps on the public buses are too high and

sometimes we fall trying to get into the bus”. Additionally, the rails on buses were thought to be too high and persons had difficulty in holding on to these for support. Other factors mentioned included violent attacks from robbers and problems of adjustment to new glasses.

Fall prevention.

Focus group members had a plethora of suggestions to help prevent falls among older persons. Improved lighting on the roads, improved road surfaces, and the use of rough-cast cobblestones for sidewalks, were all proposed. There was expressed a need for ‘buses for seniors’ which would eliminate falls associated with the mad rush and chaos while running after route taxis.

Some members had insightful comments advocating for maintaining a balanced diet and exercising regularly, as well as, having regular medical checks to address vertigo. A few persons expressed a resignation to fate, suggesting that little or nothing could be done; “Seniors will always fall”. In contrast, other persons felt something could be done. Simple practical steps to prevent falls were mentioned such as moving obstacles/dangers out of the way like fruit peels, plastic bags and other small objects, and wearing appropriate footwear; as well as fixing leaking roofs that may ultimately lead to slippery floors and falls.

The notion was expressed that little or nothing is being done by public authority to prevent seniors or anybody from falling. A matrix presenting findings from the focus groups is given as Appendix III.

Case Vignettes (distilled from in-depth interviews)

Case 1

A 60 year old female went to use the porcelain toilet bowl which had cracked some time earlier. She fell, with the bowl crashing under her weight. She had to be assisted by her husband and daughter. The porcelain chards caused severe laceration to her rectum and peri-anal area which bled profusely. She was rushed to the Accident and Emergency unit of the hospital where she was seen immediately. She received sutures, injection, and two sets of pills; one for pain and antibiotics. She was sent home and attended the community health centre for dressings. Her out-of-pocket expenses totaled \$3000.00 Jamaican dollars (\$45.45 US). She had no history of other pre-existing medical problems. In suggesting what persons can do to prevent falls, she said that, “people need to be careful when they are walking, especially when they are getting up in age, since you can get giddy, or get a cramp, or you eye get dark and pressure all those things can make you fall”. She also remarked that “Government working with the community could help provide a vehicle to take older persons who have difficulty to go to church and to the market on Saturdays or Sundays, thus reducing their risk of falling.

Case 2

A 65 year old female who indicated that falling was ‘a way of life for her’. She was diabetic and had arthritis. The first fall that she recalls was in 1999 and she has had three falls subsequently. When she fell the first time she was entering her half-finished house where she stumbled, fell on her face and hit her head on concrete block. She went to the doctor and was given pain medication. The doctor said she had injured her back. The second fall was near her gateway where she slid and fell “damaging the back even worse”. On that occasion she went to accident and emergency, where the back was x-rayed and she was give pain medication. Apart from her arthritis, she also, “wondered if the sugar [diabetes] threw me down”.

Four weeks ago, she fell again. As she lost her balance and fell backwards, she tried to ‘break the fall’, but she twisted her back and could not move then. “Now I walk and drag

my left foot, it feels very weak sometimes. I do exercise and it helps the foot, I think both the arthritis and the diabetes have something to do with the falls, and I am also foggy in my left eye”.

When asked what are some of the things that cause falls, she said, “ Roads were not perfect, they were not smooth, water settles sometimes and persons have to make their way around the water. In making houses, sometimes the steps are too high, and the yard is not level; all these things can cause one to fall”

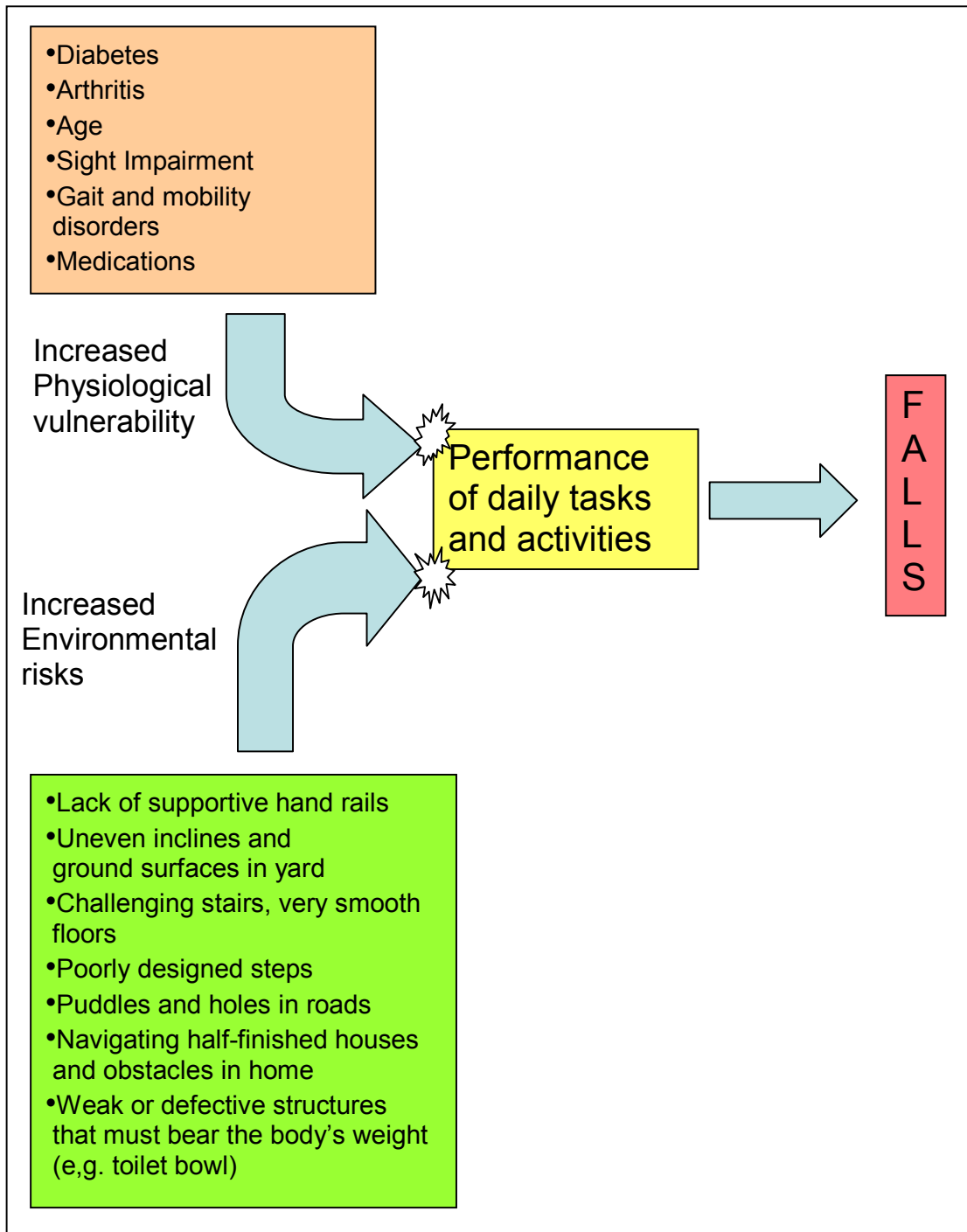
Case 3

A 72 year old man reported that he had fallen while climbing the steps to hang out some clothes three weeks ago. The wooden steps were wet and only one side had rails which was not strong enough to hold him as he started to fall. His daughter took him to the hospital accident and emergency. He was given medication for pain and had the back x-rayed. He reports from no chronic diseases, although his back had remained a problem since the fall.

His suggestions to prevent falls is to level the surface of yards which are situated on gradients, and put in appropriate rails where necessary

The cases analyzed lead to development of the schema shown in Figure 10. The key message emerging is that within the Jamaican context as elsewhere, falls represent the confluence of increased physiological and environmental risks interacting with and impacting on the performance of normal activities and tasks. Falls thus are more the result of an accumulation of various probability risks rather than mere ‘passive accidents’.

Figure 10: Falls - confluence of factors, risks and circumstances



Fall prevention and intervention policies

The review of the National Policy for Senior Citizens as well as the National Policy for Disabled Persons yielded the following.

There exists a series of policy statements, goals and strategies that are broadly outlined National Policy for Senior Citizens. These broader policy statements while not mentioning fall prevention, indirectly and encapsulate such initiatives through advocating the following:

- That Older persons should be able to live in environments that are safe and adaptable to personal preferences and changing capacities
- That the keystone of all policy is to help older persons maintain the maximum degree of independent living.
- That national policy must be multisectoral in nature with input from ministries, government, NGO's and the private sector - including housing and transport sectors.
- That the promotion of activities to safeguard the welfare of senior citizens should be an essential part of the national development plan.
- Attention to special groups particularly frail seniors, those in ill-health and the mentally incompetent are identified as needing special services (*recall vulnerability to falls*)
- Increasing the knowledge of all persons responsible for providing facts, information and advice to seniors citizens
- Health education and health promotion activities, for the prevention of disease and disability
- Training of community health workers in Health Care of Senior citizens especially on the early signs of impairment and disability in order to take timely action and establishing of a supply of technical aids including walkers, glasses, crutches and hearing aids.
- Making buildings accessible through provision of ramps and rails to staircases.
- Promotion, development and implementation of research activities to supplement current knowledge regarding the implications of ageing of the population and the needs of ageing populations; and the dissemination of information.

The majority of elderly persons are physically (88.5%) and mentally (85.9%) well. [18] However, among those who have at least one disability, the elderly are disproportionately represented. As early as 1991 the national census documented a total of 111,114 disabled persons (50,966 male and 60,148 female). Notably, 56.77% of females who were disabled were 60 years and over, while among males with disability, 46.78% were 60 years and over. [19] The National Policy for Persons with Disabilities advocates prevention of disability through a variety of measures including:

- Environmental protection (which extends to the home)
- The early detection of disability and the timely intervention to minimize disabling conditions
- The provision of assistive aids/adaptive aids for persons with disabilities and the provision of the necessary concessions to for persons to acquire the same.
- Making public transportation physically accessible to persons with disabilities

The latter policies are congruent with those of the National Policy for Senior Citizens and together synergistically foster an atmosphere conducive to the development and implementation of fall prevention activities. The stage is thus set for specific actions aimed at prevention of falls among older persons to be realized.

DISCUSSION

Limitations

Time constraints limited the number of searches and the types of analyses/research that could be pursued. To arrive at a detailed analysis of the economic impact of falls would require costing man-hours and productivity losses, medical interventions, and the social consequences of falls. Time did not allow such detailed analyses but just crude estimates of what some parameters might be were obtained.

The omission of falls as a primary or secondary diagnosis from patients' records presented a challenge. The searches of patients' records pointed clearly to the fact that many patients fell and presented to the medical facility, but fall was not recorded as a diagnosis. It was only by extensively perusing the files that the occurrence of a fall was made clear. This undoubtedly affected the ease with which cases could be identified within the periods under study. Thus, eligible cases may have been missed. Additionally, a fall could have occurred but not be necessarily recorded in some of the very cursory medical notes. Moreover, present patients records are not stored electronically which perhaps would have facilitated more comprehensive and efficient searches.

Although there exists, an awareness of falls among the elderly, few published documents attempt to capture the issue of falls in the elderly as an issue of significant public health concern in Jamaica. Hence, Jamaica-specific literature is quite limited and the relevant papers available for review were sparse.

It must be acknowledged that most of the sources from which the quantitative data is derived for this paper are not extracted from population-based or community-wide household surveys. Rather, they emanate from clinic-based or hospital-based records. As such, falls which occur without major consequences and falls which occur and are “treated at home” will not be captured. Nevertheless, the information gleaned represents a starting point; building blocks upon which data from more comprehensive studies in the future may be stacked.

Our research indicates that falls in the elderly is an issue of significant concern. The suggestion is that falls are a relatively frequent occurrence with resultant morbidity ranging from soft injury through to fractures and possibly death. Hypertension, Diabetes mellitus, cardiovascular disease, mobility disorders and sensory impairment were the most prevalent co-morbid condition associated with falls and are known to be factors that predispose to increased incidence of falls.

From both the quantitative and the qualitative analyses, it is strikingly evident that environmental or extrinsic factors play a substantial role in the genesis of falls. Outside the home, road conditions, public transport, the presence and state of sidewalks and impediments such as pools of water and holes contribute to a large number of falls. This argues for the elaboration of specific efforts to address and reduce these hazards. Such efforts must be born of a combination of advocacy by seniors, civic groups and researchers, and must also find fertile ground in the political and legislative arena.

On a practical level government and authorities need to be vigilant and must enforce the regulations that address issues such as the illegal and improper use and cluttering of sidewalks. Only then, will policy become meaningful through action. Only then, will the true benefits of fall prevention activities be realized by the consumers including seniors.

Within the house and its immediate surroundings (yard), contributory falls range from slippery floors, to uneven walking surfaces, to household clutter, to stairs without rails, to poorly constructed steps, to defective weight-bearing furniture and fixtures. In the yard, the uneven terrain, loose gravel and soil, haphazardly distributed objects as well open drains and poor drainage increase the risk of falling. Consequently, awareness and responsibility for fall prevention begins at the individual and household level. There are relatively inexpensive steps which can be taken to reduce the risks of falling. These include the use of rubber mats rather than the traditional slippery banana-bark varieties or the attractive commercially manufactured straw mats that are known to be slippery. Additionally, the use of rails and the maintenance of stools, chairs, rails and stairs can decrease the likelihood of falls and their attendant morbid sequelae.

Health practitioners and caregivers need to be acutely aware of both ‘normal physiological’ and ‘pathological’ changes with age. Distinguishing and discerning these can preemptively alter risks of falls among elderly persons if appropriate actions are taken and relevant information and advice are offered. Additionally, more astute management of drug therapy for multiple co-morbid conditions can reduce the risk of falling. Indeed, avoiding unnecessary polypharmacy and titration of medication doses to

fit clients' changing needs, changing physiology and changing activities, can markedly lessen the occurrence of iatrogenically-induced falls.

Education aimed at sensitizing persons, elderly and non-elderly, about falls and fall prevention is a critical part of any fall reduction strategy. Health education and health promotion strategies however must find resonance with the social and cultural milieu in which it is carried out. As such, in Jamaica, the settings for such health education/promotion activities should include the church, the Golden Age clubs, the corners or yards where elderly men play dominoes, and the 'home visit' made by Community Health Aides and other health professionals. In these settings, one is more likely to find captive audiences and messages are more likely to be better received. The media used is also to be tailored to the intended audience bearing in mind the special challenges of low-literacy settings or the deficits (visual, auditory, or mildly impaired cognition) that may exist. Schools are also not to be overlooked as children who learn fall prevention in school can be the stimuli for change in families and communities. This intergenerational exchange further enhances the relations between children and their older relatives.

In promoting fall prevention activities, overcoming cultural practices and preferences such as the practice of shining floors and steps until they achieve mirror-like properties ("shine like a willy-penny") may be challenging. However consistent messages and recruiting key community leaders to support such efforts may be helpful. Additionally there is need to change the cultural perceptions of "falls among the elderly as an

inevitable natural part of ageing”. The analysis of falls and how they occur indicates that it is not, and that there are specific things that can be done to prevent them. Novel approaches to change such attitudes may involve the use of role play and the discussion of case scenarios.

Policies currently remain broad and overarching. The existence of general policies which largely indirectly embrace fall prevention provides an avenue forward. However there is need to develop definite and clear fall prevention policies and programs. These would give focus to fall prevention activities and provide catalytic thrust to fall prevention efforts. Additionally, specific leadership could be provided on the issue and fall prevention more powerfully brought to the forefront of local and national activities.

Research provides the argument for advocacy and policy development. Programs also are often rooted in formative research. The preliminary findings of this paper indicate the need for greater evidence and holistic understanding of the epidemiology of falls, its incidence and associated dynamics, its associated costs and impact on the individual, family, community and state, and the best practices to reduce falls within the Jamaican setting. Special surveillance or serial surveys may need to be established to monitor the situation regarding falls. The majority of falls are preventable; the time for action is now.

Acknowledgements

The authors of this paper wish to acknowledge the contributions of Mrs. Desmalee Nevins-Holder, Mr. Shane Williams, Ms. Grace Stephenson, to the development and evolution of this paper.

REFERENCES

1. Bell JA, Talbot- Stern JK, Hennessy A. Characteristics and outcomes of older patients presenting to the emergency department after a fall: a retrospective analysis. *Medical Journal of Australia*. 2000;173:179-182. [cited 2006 September 15]. Available from http://www.mja.com.au/public/issues/173_04_210800/bell/bell.html
2. Graham J, Nunn A. Static and dynamic assessment and minimization of risk factors for falls in older people. The Alfred Care HealthCare Group of the Eastern Healthcare Network. 1996 August [cited 2006 September 17]. Available from. <http://www.monash.edu.au/rehabtech/research/reports/falls.pdf>
3. Gillespie L. Preventing falls in elderly people. *BMJ*. 2004 Mar 20[cited 2006 September 4];328(7441):653-4. Available from <http://bmj.bmjournals.com/cgi/content/full/328/7441/653>
4. Ontario Public Health Association. Prevention of falls in the elderly. 1998 [cited 2006 September 19]. Available from <http://www.opha.on.ca/resources/falls.pdf> (Originally in Ontario Medical Association, Falls in the Elderly, A Report of the OMA Committee on Accidental Injuries, Toronto: OMA, November 1992, p. 1.)
5. Zhang Z. Climbing can help elderly in preventing fall. 2004 March 22 [cited 2006 September 25]. Available from <http://bmj.bmjournals.com/cgi/eletters/328/7441/653>
6. Chu LW, Chi I, Chiu AYY. (2005). Incidence and Predictors of Falls in the Chinese Elderly. *Ann Acad Med Singapore* 2005[cited 2006 September 25];34:60-72. Available from <http://www.annals.edu.sg/pdf200502/ChuW.pdf#search=%22falls%20and%20elderly%20and%20China%22>
7. Moshiri C, Heuch I, Astrøm A, Setel P, Hemed Y and Kvale G. (2005). Injury morbidity in an urban and a rural area in Tanzania: an epidemiological survey. *BMC Public Health* 2005[cited 2006 September 15], 5:11 doi:10.1186/1471-2458-5-11. Available from <http://www.pubmedcentral.nih.gov/picrender.fcgi?artid=548509&blobtype=pdf>
8. Reyes-Ortiz CA, Al Snih S, Markides KS. Falls among elderly persons in Latin America and the Caribbean and among elderly Mexican-Americans. *Rev Panam Salud Publica*. 2005 [cited 2006 September 4];17(5/6):362-9. Available from <http://www.scielosp.org/pdf/rpsp/v17n5-6/26273.pdf#search=%22falls%20in%20the%20elderly%20and%20Caribbean%22>
9. Velkoff V and Lawson V. **Gender and Aging: Caregiving**. International Brief. 1998 December [cited 2006 September 6]; pp. 1-7. US Department of Commerce, Economics and Statistics Administration, Bureau of Census.; Available from <http://www.census.gov/ipc/prod/ib-9803.pdf>

10. Melton LJ. Hip fractures: a worldwide problem today and tomorrow. *Bone*. 1993;14 Suppl 1:S1-8
11. Cumming RG, Nevitt MC, and Cummings SR. (1997). Epidemiology of Hip Fractures. *Epidemiol Rev*. 1997[cited 2006 September 15];19(2):244-257. Available from <http://epirev.oxfordjournals.org/cgi/reprint/19/2/244.pdf>
12. UN.org. Country profile: Status and implementation of national policies on ageing in Jamaica. [cited 2006 September 15]. Available from <http://www.un.org/esa/socdev/ageing/workshops/vn/jamaica.pdf>
13. Pan-American Health Organization. Health Conditions in the Caribbean. Scientific Publication No. 561; Washington DC: PAHO; 1997.
14. McDonald AH, Dawkins N, Titus IP. Patterns of trauma injuries in rural versus urban Jamaica. *West Indian Med J*. 2001;50(3):214–7.
15. Williams-Johnson JA, Wilks RJ, McDonald AH. Falls: A modifiable risk factor for the occurrence of hip fractures in the elderly. *West Indian Med J*. 2004 Sep;53(4):238-41.
16. Bueno-Cavanillas A; Padilla-Ruiz F, Jimenez-Moleon JJ, Peinado-Alonso CA, Galvez-Vargas R. Risk factors in falls among the elderly according to extrinsic and intrinsic precipitating causes. *European Journal of Epidemiology*. 2000;16(9):849-859
17. Fuller GF. Falls in the elderly. *American Family Physician*. 2000 [cited 2006 September 18]; 61(7):2159-68, 2173-4. Available from <http://www.aafp.org/afp/20000401/2159.html>
18. Ministry of Labour and Social Security. National Policy for Senior Citizens. Kingston Jamaica: Ministry of Labour and Social Security; 1997.
19. Ministry of Labour and Social Security. National Policy for Persons with Disabilities. Kingston Jamaica: Ministry of Labour and Social Security; 2000.

Other Comments

APPENDIX II
FOCUS GROUP DISCUSSION QUESTIONS
PERCEPTION OF RISK FOR FALLS

Thank you for accepting to come to a meeting that will be held on September 13, 2006 at 10:00 am at (location) to talk about falls in persons 60 years and older.

Here are the questions you will be asked during that meeting. Please read them before coming and think about what you will want to say in answering these questions.

Think about the corrective and preventative measures that can be put in place to prevent falls and how these measures can be implemented.

QUESTIONS

1. How many of you have fallen recently?
2. What is it like to live in your house?
3. Do you feel afraid that you may fall?
4. In what area of the house do you think you are most likely to fall and why?
5. When you leave home what activity example (taking the bus, going into a building, climbing the ramp etc.) do you think create the greatest risk for falling?
6. When walking on the road what are challenges that could lead to a fall?
7. When entering a building what are the challenges that could lead to falls?
8. When taking public transportation what are the risks of falling?

Fall Prevention measures

1. What are some fall prevention measures applicable to the home setting?
2. What are some of the fall prevention measures applicable to public buildings?
3. What are some of the fall prevention measures applicable to public transportation?
4. What are some of the policies you would like to see in place to prevent falls in senior citizens?

APPENDIX III: FOCUS GROUP SUMMARY MATRIX.

Places where falls occur and suggested reasons	Impact of fall	Fall Prevention Strategies
<p>On the public bus</p> <ul style="list-style-type: none"> • Not enough seats on bus so seniors stand and fall • The steps are too high • Not enough seats dedicated to seniors • Not enough low rails to hold. So seniors loose balance and fall • <p>On the streets</p> <ul style="list-style-type: none"> • Fell in pothole • Fell in puddle of water on street • Fell because sidewalk is uneven • Fell because of no sidewalk <p>Violence</p> <ul style="list-style-type: none"> • Attack by robbers <p>At home</p> <ul style="list-style-type: none"> • In Bathroom • On rugs • On steps • Off ladder • In water on floor 	<p>Loss of job and hospitalization Fractured limbs Very expensive medical bills</p> <p>Loss -shoe Damage- legs</p> <p>Lost handbag</p> <p>Fractures</p>	<ul style="list-style-type: none"> • Bus for seniors only • More seats on bus dedicated to seniors • Bus crew too impatient and ill-mannered, need special crew for seniors. • Need more respect from the public for seniors. • <p>Road repair and maintenance</p> <ul style="list-style-type: none"> • Fix potholes • Make sidewalk • Improve lightening • Improve crossing for seniors • Improve road surface • • debush the place and make more parks so less likely for robbers to hide • Improve lighting <p>Make home safer</p> <ul style="list-style-type: none"> • Use non slips tiles • Remove rugs and other floor pieces out of path • Make floor surfaces even

