

Prevalence of Falls among Older Adults in Africa: A Meta-Analysis

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ABSTRACT

The purpose of this study was to conduct a meta-analysis of studies that have examined the prevalence of falls among older adults living in Africa. Three investigators independently searched the databases of PubMed, EMBASE, Google Scholar, and Web of Science from their inception date until September 2019. Participants were 5,815 older adults aged 60 years and above. The prevalence of falls was determined using the random effects meta-analysis, whereas meta-regression was conducted to investigate the moderating factors. Eleven of the 921 potentially relevant studies met the inclusion criteria and were included in the meta-analysis. The meta-analysis revealed a pooled prevalence of fall rate of 24.2% (95% CI: 23.1%-25.3%, I² = 95.2%). Multivariate meta-regression analysis found no moderating effects of study sub-region, study year, and sample size on fall prevalence (p values > 0.05). Falls among older adults living in Africa are common and therefore need continuous research to examine the possible risk factors associated with falls among older adults and to establish effective policies and prevention approaches to reduce risk.

Keywords : Fall, Prevalence, Older adults, Meta-analysis

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I. INTRODUCTION

The growing number of older adult persons in developed and developing countries is a challenge ^[1]. This occurrence is known as "population aging"^[2]. It is predicted that by 2050, the population of older adults

aged 60 years and over will rise by 2 billion, which for the first time will be higher than the children's population^[3]. Africa is among the world's fastest growing elderly populations, with a massive increase in life expectancy arising from medical interventions^[4]. Consequently, the growing number

of older adults poses health issues, such as increasing fall rates^[4]. In addition, aging causes several adverse changes, which cause different body systems to become ineffective. Also, many chronic illnesses may occur during aging, which contribute to the prevalence of falls among older people^[5, 6].

While the chances of fall increase with age, falls have become a serious public health issue for older people^[1] because they are a significant cause of morbidity and death^[7, 8]. One in five people who fall and experience a hip fracture will never walk and die within six months^[9]. Although the definition of a fall is not universal, it can be defined as an accidental occurrence leading to an individual falling due to unexpected paralysis, epileptic seizure, or excessive external forces^[10].

Studies on falls suggest an annual occurrence of between 6.5 and 42%^[11, 12]. There is a fall of around 30 to 60% per year for individuals aged 65 and over and a 50 % increase for older people over the age of 80 years^[13]. In a Spanish study, the prevalence of falls among older adults aged 70 years and above was 31.78%; 12.9% experienced more than one fall a year before^[14]. Another Italian study found a 28.6 % prevalence of falls in older adults in the last 12 months^[15]. The Center for Disease Control (CDC) has confirmed that falling, among all causes, is the 9th leading cause of death in older adults 65 years of age and above^[16, 17]. The prevalence was 23% in older adults 60 years or older during two separate falls studies in Africa^[18, 19]. Falls among older adults result in an immense economic burden, leading to 27% of hospital costs^[20]. This problem is expected to worsen with multiple fractures and high healthcare costs^[20]. Falls have been reported mainly in high-income countries^[21-23], but there has not been a comprehensive analysis of their magnitude and effect on older adults living in Africa.

Throughout Africa, data on the prevalence of falls for older adults is sparse, with some contradictory reports. Understanding the overall prevalence of falls

among older African adults is critical for developing successful risk management strategies and prevention approaches. This study aims to perform a meta-analysis for studies examining the prevalence of falls among older African adults. To the best of our knowledge, the overall prevalence of falls in Africa has not been meta-analyzed.

II. METHODOLOGY

A. Search strategy.

We performed a broad systematic literature search. PubMed, EMBASE, Google Scholar, and Web of Science were independently searched from their inception until September 2019 using the preferred reporting items for systematic reviews and meta-analysis (PRISMA) statements. Four investigators conducted the search (SAD, JAN, EL, JOK). The search items included: falls, prevalence, cross-sectional, older adults, and Africa. In addition, we manually searched the reference lists to find other related studies that may have been missed. Also, we established an email alert feature in related electronic databases to notify about any new publication that might meet our study criteria.

B. Inclusion and exclusion criteria.

Independent screening and review of titles, abstracts, and texts were conducted by four investigators (SAD, JAN, EL, JOK). There was no access to the full text of one paper^[24], and this analysis was not included. Three investigators (SAD, JAN, JOK) examined the eligibility of the studies. Differences were deliberated and resolved between them, or a third investigator (EL) was involved, if necessary.

The inclusion criteria were: a cross-sectional survey conducted in any African country; older adults aged 60 years and above; a study reported time-frame (for example, one week or one month); the rate (percentage) of falls. The definition of fall was not included in this meta-analysis because there are various definitions of falls with no universally accepted definition.

Reviews and meta-analyses were excluded. This study also excludes studies that did not have any information on the time frame.

C. Data extraction and quality assessment.

Three investigators separately collected relevant information using a double coding technique (JAN, FA, PYB). In case of any disagreements, a fourth investigator (EL) was involved until consensus was reached. Finally, four investigators identified and entered the study data in a spreadsheet (SAD, JAN, FA, JOK). The data in the spreadsheet included; the first author, study year, country, sub-region, study duration, sample size, gender, and the number of falls among the study population.

Two authors evaluated the quality of the included studies separately (SAD, PYB) using the Newcastle-Ottawa Quality Assessment Scale^[25]. The Newcastle-Ottawa Quality Assessment Scale assessed the study group selection, comparability of the group, and the outcome of interest. The score of 9 stars for non-randomized studies was considered to be 'high quality.' Any inconsistencies were resolved with the help of a third investigator (EL).

D. Statistical analysis

STATA SE version 14.2 (Stata Corp, College Station, Tx) was used to conduct all the analysis. Using Higgins' I^2 statistic, this study assessed the homogeneity of fall prevalence. An I^2 score above 50% suggests a high heterogeneity^[26]. The 95% Confidence Intervals (CI) of fall prevalence was synthesized using the Dersimonian and Laird random effect model. A meta-regression was conducted to assess the possible score of heterogeneity. A funnel plot was conducted to test publication bias. Multivariate logistic regression was conducted to examine the independent association of high fall rate with study sub-region, study year, and sample size. The dependent variable was high fall rate with study sub-region, study year, and sample size as the independent variables. Results from the analysis were considered significant when $p < 0.05$.

III.RESULTS

The literature search resulted in a total of 921 studies, and 11 out of these papers met the inclusion criteria and were included in the meta-analysis. Figure 1 shows the study selection.

Table 1 Summary characteristics of 11 studies included in the meta-analysis

No.	First Author	Study year	Country	Sub-region	Sample Size	Age range	Female	No. of Fallers
1	Kalula	2015	South Africa	Southern Africa	837	≥ 65	640 (76.5)	221
2	Bekibele	2009	Nigeria	West Africa	2096	≥ 65	NR ^a	482
3	Akosile	2014	Nigeria	West Africa	180	≥ 65	91 (50.6)	50
4	Allain	2014	Malawi	Eastern Africa	98	>60	69 (70.4)	40
5	Kamel	2013	Egypt	North Africa	340	>60	215 (63.2)	205
6	Adebiyi	2009	Nigeria	West Africa	210	>65	105 (50)	45
7	Maruf	2016	Nigeria	West Africa	131	>65	84 (64)	38
8	Ntagungira	2005	Rwanda	Eastern Africa	200	>60	73 (36.5)	46
9	Hamed	2016	Egypt	North Africa	1034	>60	207 (32.2)	350
10	Allain	1997	Zimbabwe	Southern Africa	278	>60	154 (55.4)	39
11	Altehewy	2015	Egypt	North Africa	411	>60	187 (45.5)	46

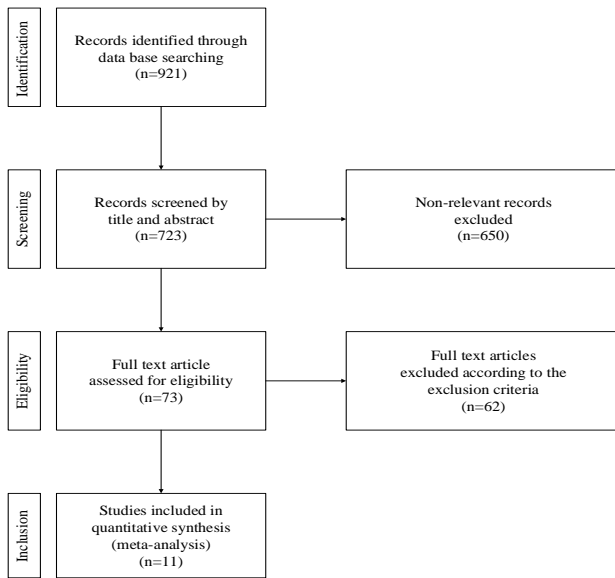


Fig. 1 Flow Chart of the study selection

Study characteristics

The study characteristics are illustrated in Table 1. Four studies were conducted in West Africa, 3 in North Africa, 2 in South Africa, and 2 in East Africa. The study year ranged from 1997 to 2016. The number of participants in the selected studies ranged from 98 to 2,069, totalling 5,815.

Table 1 Summary characteristics of 11 studies included in the meta-analysis

The prevalence of falls ranged from 11.2% to 60.3%. A total of 1,562 (26.9%) participants were identified as fallers.

Egger’s regression of publication bias did not reveal publication bias (z = 4.01, p = 0.82). A funnel plot of observed fall prevalence rates is shown in Figure 2.

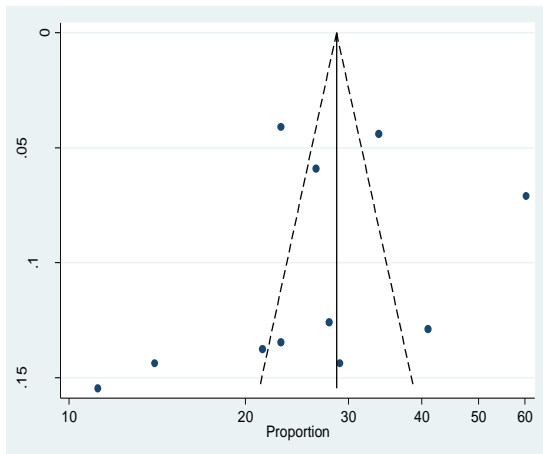


Fig. 2 Funnel plot of publication bias

The meta-analysis revealed a pooled prevalence of fall rate of 24.2% (95% CI: 23.1%-25.3%, I² = 95.2%). The meta-analysis together with upper and lower confidence interval limits for the prevalence of falls, are illustrated in Figure 3.

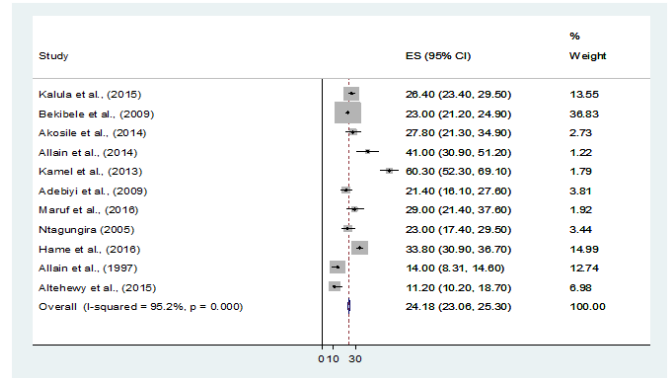


Fig. 3 Forest plot of the prevalence of falls among older adults in Africa

Results of the meta-regression are shown in Table 2. Multivariate meta-regression did not find any moderating effects of study sub-region, study year, and sample size on fall prevalence (p values > 0.05). Also, multivariate binary logistic regression analysis did not show any significant association between the high rate of falls and study sub-region, survey year, and sample size (p values > 0.05).

Table 2 Multivariate logistic regression and meta-regression of the prevalence of falls

	OR	P	95% CI
Sample Size	1.00	0.81	[1.00-1.00]
Study year	1.31	0.23	[0.84-2.03]
Sub-region	0.40	0.48	[0.03-0.5.18]
	exp(b)	P	95% CI
Sample Size	2.9	0.10	[0.01-0.6.9]
Study year	0.91	0.90	[0.15-0.5.6]
Sub-region	172.9	0.20	[0.04-850802.6]

IV. DISCUSSION

This study examines the prevalence of falls among older adults living in Africa. Falls have become a great public health concern for older adults since they are a major cause of morbidity and death. Although several studies have explored the prevalence of falls among older adults, there is very little research into the magnitude and effect of falls among older adults living in Africa. The quality of the included studies was determined with the Newcastle-Ottawa Quality Assessment Scale. For non-randomized studies, a score of 9 stars was found to be of "high quality."

The combined prevalence of falling among older adults living in Africa was 24.2%, significantly higher than in a previous meta-analysis study (17.3%) conducted in western countries^[27]. Variations in prevalence rates may be attributable to ethnicity, culture, study design, or other relevant factors. Similar to previous studies^[18, 19, 28-30], the prevalence of falling occurred within the range (11% -25%). However, the overall prevalence of falls in Africa was lower than in the study conducted in Egypt (60.3%)^[31]. In Egypt, the higher prevalence of falls may be influenced by a series of risk factors associated with falls. In this context, examining the prevalence and risk factors of falls in older adults in Africa is imperative to establish effective risk reduction policies and prevention approaches. The results suggest that about a third (1,562) of older adults have fallen. As a common phenomenon among older adults, healthcare professionals need to focus more on older adults as part of their clinical care routine by screening for falls.

In the studies, the prevalence of falls among older adults ranged from 11.2% to 60.3%. Two separate studies conducted in North Africa (Egypt) recorded the highest (60.3%) and lowest (11.2%) prevalence of falls among older adults. Four studies conducted in West Africa (Nigeria) had a prevalence rate of falls ranging from 21% to 29%. However, in Southern Africa (South Africa, Zimbabwe), the prevalence of

falls among older adults was 26.4% and 14%, respectively. Malawi and Rwanda in the Eastern part of Africa recorded a fall prevalence of 41% and 23%, respectively. As mentioned earlier, there may be several factors related to differences in prevalence rates. The definition of fall, sample size, and methods used in the sampling may play a significant role in the variations of prevailing falls in the included studies. For instance, the samples of the included studies ranged from 98 to 2,096 individuals, which may affect their results. While the results of an earlier study revealed that the sample size was a moderating influence on the fall prevalence^[32], we did not find this in our study. Concerning the definition of falls, some studies have described a fall to include a fall over the past 12 months, while others have described a fall to include that which has occurred over the past 24 months. Furthermore, our study found no significant moderating effects on the prevalence of falls caused by the study year and region.

There was a higher prevalence of falls among females compared to males in 10 [5, 18, 19, 28, 29, 31, 33-36] out of the 11 studies included in the study. This could depend on various hormonal changes that women experience during aging, leading to a faster bone mass reduction than in males^[37]. Another study^[14] also confirmed that being a woman is a factor that makes older adults more likely to fall.

As falling in older adults leads to physical disabilities, fall prevention programs should be designed to enhance functionality through the implementation of evidence-based interventions for physical functioning^[38]. As most prevention programs concentrate exclusively on home safety^[39], we suggest the inclusion of home self-handling. Furthermore, patient and caregiver education is necessary before discharge from the hospital to prevent older adults from falling.

One strength of this meta-analysis is that it is the first study in Africa to investigate the prevalence of falls in older adults. The study had a large sample size

gathered. However, it is important to interpret these findings carefully due to certain methodological limitations. The 11 studies included in this study involved only 6 countries, with the majority coming from West Africa, which may limit the generalizability of the results. Also, some of the studies did not provide some important factors associated with falls, such as a universally accepted definition of falls and a specified study duration. Lastly, there was no access to the full text of one study, which may have biased the results to an uncertain degree.

V. CONCLUSION

This meta-analysis found that falling among older adults living in Africa was common. There is a need for continuous research to examine the possible risk factors associated with falls among older adults living in Africa and to establish effective policies and prevention approaches to reduce risk.

Conflict of interest: The authors declare that they have no conflict of interest.

VI. REFERENCES

- [1]. WILLIAMS J S, KOWAL P, HESTEKIN H, et al. Prevalence, risk factors and disability associated with fall-related injury in older adults in low- and middle-income countries: results from the WHO Study on global AGEing and adult health (SAGE) [J]. *BMC medicine*, 2015, 13(1): 1-12.
- [2]. COLEMAN D A. Population ageing: an unavoidable future [J]. *The welfare state reader*, 2006, 2(298-308).
- [3]. UND D O P I. Population ageing. Facts and Figures. Building a society for all ages. [M]. 2002.
- [4]. KALASA B. Population and ageing in Africa [J]. *A policy dilemma Country report*, 2004, 84(1-14).
- [5]. HAMED A F, MOHAMMED N A, ALY H. Elderly Falls Prevalence and Associated Factors in Sohag Governorate [J]. *The Egyptian Journal of Community Medicine*, 2017, 35(4): 1-13.
- [6]. OLIVEIRA F S, SANTOS S S C, KERBER N P D C, et al. Scientific production about the environmental risk factors for falls in the elderly: integrative review [J]. *Revista de Enfermagem UFPE On Line*, 2015, 9(2): 759-67.
- [7]. BISCHOFF-FERRARI H A, ORAV E J, DAWSON-HUGHES B. Effect of cholecalciferol plus calcium on falling in ambulatory older men and women: a 3-year randomized controlled trial [J]. *Archives of internal medicine*, 2006, 166(4): 424-30.
- [8]. MURRAY C J, VOS T, LOZANO R, et al. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010 [J]. *The lancet*, 2012, 380(9859): 2197-223.
- [9]. LUXTON T, RIGLIN J. Preventing falls in older people: a multi-agency approach [J]. *Nursing Older People (through 2013)*, 2003, 15(2): 18.
- [10]. FEDER G, CRYER C, DONOVAN S, et al. Guidelines for the prevention of falls in people over 65 [J]. *Bmj*, 2000, 321(7267): 1007-11.
- [11]. GANG L, SUFANG J, YING S. The incidence status on injury of the community-dwelling elderly in Beijing [J]. *Chi J Prev Med*, 2006, 40(1): 37.
- [12]. WANNIAN L, YING L, XUEQING W, et al. An epidemiological study on injury of the community-dwelling elderly in Beijing [J]. *Chin J Dis Control Prev*, 2004, 8(6): 489-92.
- [13]. CAVALCANTE A L P, AGUIAR J B D, GURGEL L A. Fatores associados a quedas em idosos residentes em um bairro de Fortaleza, Ceará [J]. *Revista Brasileira de Geriatria e Gerontologia*, 2012, 15(137-46).
- [14]. VARAS-FABRA F, CASTRO M, DE TORRES L. P, Fernandez Fernandez MJ, Ruiz MR, Enciso

- BI: Falls in the elderly in the community: prevalence, consequences, and associated factors [J]. *Aten Primaria*, 2006, 38(450-5).
- [15]. MANCINI C, WILLIAMSON D, BINKIN N, et al. Epidemiology of falls among the elderly [J]. *Igiene e sanita pubblica*, 2005, 61(2): 117-32.
- [16]. CLEMSON L, CUMMING R G, KENDIG H, et al. The effectiveness of a community-based program for reducing the incidence of falls in the elderly: A randomized trial [J]. *Journal of the American Geriatrics Society*, 2004, 52(9): 1487-94.
- [17]. MICHAEL Y L, WHITLOCK E P, LIN J S, et al. Primary care-relevant interventions to prevent falling in older adults: a systematic evidence review for the US Preventive Services Task Force [J]. *Annals of internal medicine*, 2010, 153(12): 815-25.
- [18]. BEKIBELE C, GUREJE O. Fall incidence in a population of elderly persons in Nigeria [J]. *Gerontology*, 2010, 56(3): 278-83.
- [19]. NTAGUNGIRA E K. Epidemiology of and risk factors for falls among the community-dwelling elderly people in selected districts of Umutara Province, Republic of Rwanda [D]; University of the Western Cape, 2005.
- [20]. DIBREZZO R, SHADDEN B B, RAYBON B H, et al. Exercise intervention designed to improve strength and dynamic balance among community-dwelling older adults [J]. *Journal of aging and physical activity*, 2005, 13(2): 198-209.
- [21]. BERGLAND A, WYLLER T B. Risk factors for serious fall related injury in elderly women living at home [J]. *Injury prevention*, 2004, 10(5): 308-13.
- [22]. O'LOUGHLIN J L, ROBITAILLE Y, BOIVIN J-F, et al. Incidence of and risk factors for falls and injurious falls among the community-dwelling elderly [J]. *American journal of epidemiology*, 1993, 137(3): 342-54.
- [23]. TINETTI M E, SPEECHLEY M, GINTER S F. Risk factors for falls among elderly persons living in the community [J]. *New England journal of medicine*, 1988, 319(26): 1701-7.
- [24]. AKOSILE C O, FABUNMI A A, UMUNNAH J O, et al. Relationships between fall indices and physical function of stroke survivors in Nigeria [J]. *International Journal of Therapy and Rehabilitation*, 2011, 18(9): 487-91.
- [25]. WELLS G, SHEA B. O Connell D, Peterson J, Welch V, Losos M, Tugwell P [J]. *The Newcastle Ottawa Scale (NOS) for assessing the quality if nonrandomized studies in meta-analyses*, 2014,
- [26]. HIGGINS J P, THOMPSON S G, DEEKS J J, et al. Measuring inconsistency in meta-analyses [J]. *Bmj*, 2003, 327(7414): 557-60.
- [27]. RAO W-W, ZENG L-N, ZHANG J-W, et al. Worldwide prevalence of falls in older adults with psychiatric disorders: A meta-analysis of observational studies [J]. *Psychiatry research*, 2019, 273(114-20).
- [28]. ADEBIYI A, UCHENDU O, IKOTUN O, et al. Falls and outcomes amongst old people in rural dwellings [J]. *Annals of Ibadan Postgraduate Medicine*, 2009, 7(2): 6-11.
- [29]. AL TEHEWY M M, AMIN G E, NASSAR N W. A study of rate and predictors of fall among elderly patients in a university hospital [J]. *Journal of patient safety*, 2015, 11(4): 210-4.
- [30]. ALLAIN T J, WILSON A O, GOMO Z A R, et al. Morbidity and disability in elderly Zimbabweans [J]. *Age and Ageing*, 1997, 26(2): 115-21.
- [31]. KAMEL M H, ABDULMAJEED A A, ISMAIL S E-S. Risk factors of falls among elderly living in Urban Suez-Egypt [J]. *Pan African medical journal*, 2013, 14(1):
- [32]. BISCHOFF-FERRARI H A, DAWSON-HUGHES B, WILLETT W C, et al. Effect of vitamin D on falls: a meta-analysis [J]. *Jama*, 2004, 291(16): 1999-2006.

- [33]. ZIMBA KALULA S, FERREIRA M, SWINGLER G, et al. Prevalence of falls in an urban community-dwelling older population of Cape Town, South Africa [J]. *The journal of nutrition, health & aging*, 2015, 19(10): 1024-31.
- [34]. AKOSILE C O, ODIDIKA F J, OKOYE E C, et al. Physical function, fear of falling, occupational status and falls in a Nigerian older adults sample [J]. *Ageing international*, 2015, 40(4): 327-37.
- [35]. ALLAIN T, MWAMBELO M, MDOLO T, et al. Falls and other geriatric syndromes in Blantyre, Malawi: a community survey of older adults [J]. *Malawi medical journal*, 2014, 26(4): 105-8.
- [36]. MARUF F A, MUONWE C, ODETUNDE M. Social risk factors for falls among rural Nigerian community-dwelling older adults [J]. *Geriatrics & Gerontology International*, 2016, 16(6): 747-53.
- [37]. ALQAHTANI B A, ALSHEHRI M M, HOOVER J C, et al. Prevalence of falls among older adults in the Gulf Cooperation Council countries: a systematic review and meta-analysis [J]. *Archives of gerontology and geriatrics*, 2019, 83(169-74).
- [38]. CLEMSON L, MACKENZIE L, BALLINGER C, et al. Environmental interventions to prevent falls in community-dwelling older people: a meta-analysis of randomized trials [J]. *Journal of Aging and Health*, 2008, 20(8): 954-71.
- [39]. RUSSELL M A, HILL K D, BLACKBERRY I, et al. The reliability and predictive accuracy of the falls risk for older people in the community assessment (FROP-Com) tool [J]. *Age and ageing*, 2008, 37(6): 634-9.

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