RISK FACTORS FOR FALLS AMONG POSTMENOPAUSAL WOMEN IN HAYATABAD, PESHAWAR

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ABSTRACT

OBJECTIVE: The objective of this study is to investigate the risk factors of falls in postmenopausal women.

METHODS: The study was a cross sectional survey of 200 postmenopausal women aged 50 years and above resident in Hayatabad community, Peshawar. Participants were selected by convenient sampling from different phases of Hayatabad. Women with hormone replacement therapy, surgeries such as hysterectomy and women with disabilities were excluded. Fall risk was assessed by the Berg Balance scale and the risk factors of falls were investigated by a self-administered questionnaire. The data obtained was analyzed on SPSS version 20.

RESULTS: Two hundred postmenopausal women with mean age 62.5± 2.7 participated in the study. Majority of the participants (n=175, 87.5%) were house wives while remaining 25 (12.5%) were having different jobs.

The most significant predictor of high risk of fall was Diabetes (OR= 8.43, p <0.001), which suggested that diabetic women were 8.43 times more prone to fall than those without diabetes. The second significant predictor in the model was poor hearing (OR= 5.05. p <0.05) followed by incontinence (OR= 5.01, p <0.01) and fear of falling (OR= 4.41, p <0.05). The significant predictor of medium fall risk was muscle problem (OR= 3.13, p < 0.05) and high or low blood pressure (OR= 2.41. p <0.05) .

CONCLUSION: This cross sectional survey identified risk factors that independently predicted a significantly increased risk of falling in postmenopausal women. The most significant predictor of high risk of fall was Diabetes followed by poor hearing, incontinence, and fear of falling. Increase in risk of fall was found to be related with increasing number of risk factors.

KEY WORDS: Falls, Postmenopausal, Risk factors, Women.

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INTRODUCTION

Falls may cause significant injuries and complications that may prove fatal(1). As women reached menopause, a dramatic decline in specific muscle force was observed (2). The intense peri-menopausal decline in muscle strength is a likely justification for the recognized rises in falls and injuries. Furthermore, increasing literature reported that many older adults face apprehension related to falls and this fear of falling was more prevalent in women than in men (3,4).

In a given year, one out of four older women experience a fall.[1] Women have 1.5 times more annual fall incidence than men (2). The bone density in women decreases from the fourth decade and deterioration of bone, muscle mass and strength occurs at an earlier age than men (3-7). The muscle weakness started later in men and decline in specific muscular force in men was more gradual and acquired than postmenopausal women (6). Furthermore apprehension related to falls is more prevalent in women than in men (8,9). Fall survivors may have restricted activity owing to soft tissue injuries, fractures and psychological consequences such as fear of falling (FOF), self-inefficacy, and avoidance of activities and loss of self-confidence (10-14).

Falls result from the complex interaction of risk factors which reflect multiple health determinants that directly or indirectly affect wellbeing (15). Tinetti et al. and Kronofol et al. reported that patients suffering from chronic medical condition have increase risk of falls (16,17). Similarly, it is reported that elder women are more prone to fall than younger women because they more likely to suffered from chronic disease, and had a higher body mass index (18). In fractures occurrence, interaction is found between falls and osteoporosis. Though age by itself is not responsible for fall risk, it is the co-morbidity of aging related changes. Women with low leg mass, balance disorders, taking more than three medications, had an increased risk of falls (17). The risk of fracture due to a fall event was considerably higher in women than in men (19). It was also found that women might fall differently than men and absorb mechanical energy at different regions of the body (hip) than men (head) (20). Drugs such as sedatives and tranquillizers are prescribed for cognitive disorders can also cause hypotension, induce syncope, seizures, and mental effects such as loss of watchfulness and confusion, all of which can result in falls (21).

Postmenopausal women tend to fall due to interaction of health determinants and changes in hormone levels. Moreover, according to authors knowledge there is lack of evidence that shows risk factors associated with postmenopausal women in Pakistan. Therefore, current study was designed in order to investigate the risk factors of falls in postmenopausal women.

METHODS

The study was carried out in the community of Hayatabad, Peshawar from September, 2017 to January, 2018.Data was collected from 200 postmenopausal women aged 50 years and above. The study was conducted as a cross sectional survey through convenience sampling from different phases of Hayatabad. The study excluded women who had not yet experienced menopause, women younger than 50 years and those who dwelled outside the Hayatabad community. Postmenopausal women taking hormone replacement therapy, wheel chair users or bed ridden and those who are unable to stand unassisted for a minimum of 1 minute were also excluded. In addition women with a history of hysterectomy, salpingectomy or oophorectomy were also ineligible for the study.

Information about the study was conveyed to all the participants and informed consent was obtained from all participants. Participation in this survey was on voluntarily basis and no financial or other benefits were offered. Data was collected by independent data collectors who were well aware about the study. Information was collected through a self-reported questionnaire and by Berg balance scale. The Berg Balance Scale helped to assess the risk of falls by evaluating balance ability of the participants. Body mass index was calculated in order to assess the association of body weight with fall risk. The self-administered questionnaire was used to find the risk factors for falls including age, weight and height, history of falls and related injuries, gait and mobility, comorbidities, medications and home hazards. Data was analyzed using SPSS version 20.

RESULTS

Two hundred postmenopausal women with mean age 62.5± 2.7 participated in the study. Majority of the participants (n=175, 87.5%) were house wives while remaining 25 (12.5%) were having different jobs. Age was significantly related to fall risk. Advanced age suggested high fall risk, however, results suggested that there was no correlation between fall risk and BMI (**Table 1).**

Table1. *Correlation among BBS, age, and BMI*

Variables	BBS
Age	-0.26**
BMI	0.03

Significant at $p < 0.01$

Multiple logistic regression was performed to evaluate the impact of risk of fall among high fall risk group and medium fall risk group. The full model containing all predictors are statisctially significant, $\chi 2$ (18, N= 200) = 76.62, p< .001, indicating that the model was able to distinguish between groups which were affected or not affected by the conditions. The model was as a whole explained between 32% (Cox and Snell R square) and 38% (Nagelkerke R squared) of the variance in risk of fall.

The most significant predictor of high risk of fall was Diabetes (OR= 8.43, p <0.001), which suggested that diabetic women were 8.43 times more prone to fall than those without diabetes. The second significant predictor in the model was poor hearing (OR= 5.05. p <0.05)which suggested that the womenwith poor hearing were 5.05 times higher on fall risk than those who were not. The third significant risk factor was incontinence (OR= 5.01, p <0.01)which suggested that the women who reported incontinence were 5.01 times more prone towards high risk of fall. The fourth predictor of risk of fall was fear of falling (OR= 4.41, p <0.05) showing that they were 4.41 times more likley to cause high risk of fall.

However, the predictors of medium fall risk were different from the predictors ofhigh fall risk. The significant predictor of medium fall risk was muscle problem (OR= 3.13, p < 0.05), suggested that those women who had muscle problems like muscular pain ,cramps or weakness were 3.13 times at medium fall risk than those without any muscle problems. The second predictor in the model was blood pressure (OR= 2.41. p <0.05) which suggested that women who reported high or low blood pressure had 2.41 times medium fall risk than those with normal blood pressure. (Table 2)

Table 2. Logistic regression model predicting likelihood of high fall risk and medium fall risk in a sample of females (N = 200).

Variables	B	SE	Wald	Odd ratio	Lower	Upper
High Fall Risk Group						
Diabetes	2.13	0.56	14.42	8.43***	2.81	25.34
Poor Hearing	1.62	0.71	5.22	5.05*	1.25	20.26
Incontinence	1.61	0.74	4.64	5.01*	1.15	21.67
Fear of Falling	1.48	0.70	4.47	4.41*	1.11	17.46
Medium Fall Risk Group						
Muscle problems	1.14	0.57	3.99	3.13*	1.02	9.59
Blood Pressure	0.88	0.38	5.26	2.41*	1.13	5.14

***p< 0.001, *p<0.05

The fall risk increases in women who take specific medications.Similarly polypharmacy was shown to increase the fall risk. (Table 3)

Table 3: Correlation between fall risk and medications

Variables	BBS	Heart Tablets	Sleeping pills	BP Tablets	Polypharmacy
BBS	---				
Heart Tablets	-0.21**	---			
Sleeping pills	-0.16*	0.13	---		
BP Tablets	-0.17*	0.12	0.18*	---	
Polypharmacy	-0.36**	0.19**	0.24**	0.30**	-------

Siginifican at p<0.01, P<0.05

DISCUSSION

Falls in post menoupasal women can lead to serious complications including fractires, soft tissue injuries and head injury. The objective of this study is to investigate the risk factors of falls in postmenopausal women.

Deandrea et al investigated association of advanced age with risk of falls showing that for an increase of 5 years in age, the OR was 1.12 (95% CI= 1.07–1.17) for those who fall once and 1.12 (1.07–1.18) for those who had recurrent falls (22). Female gender was also shown to be related with increased fall risk (OR =1.3 for those who fall once and OR =1.3 for those who had recurrent falls. Most of the literature found an increased risk of falls for women (22). These findings correlate with our results showing lower BBS scores with advanced age. However our study showed no correlation of fall risk with BMI, although a study by Arnold et al suggested BMI to be associated with history of falls in women (23).

Schwartz et al reported older women with diabetes to more likely fall somewhat because of the elevated rates of known risk factors for falls (24). The study reported that diabetic women had higher fall rates specific to age than women without diabetes. Growing proportions of diabetic women experienced fall incidents more than once a year and more than twice a year than non diabetic women(24). Wallace et al also reported that falls were common in diabetic adults and those with prior foot ulcers (19). Long standing diabetes mellitis has a number of well known complications such as peripheral and autonomic neuropathy, diabetic retinopathy, diabetic foot or hypoglycemic state from poor blood glucose control, each of which can predispose the diabetic profoundly towards the risk of falls (25). Maurer et al reported fall incidence in diabetic older adults to be 78% compared to 30% in non-diabetics (p <.001) (26). Although diabetes shows little inclination towards gender, it is slightly more prevalent in women with increasing age (27). Our study suggested diabetes mellitus to be the strongest risk factor for falls in women with odds ratio 8.43 and p value<0.001, showing that diabetic women are 8.43 times more inclined towards fall risk than non diabetic women.Patel et al found falls to be very common in diabetic women as 41% of these women gave a history of previous fall in the last 12 months compared to the commonly reported figure of 28–35% for the over-all population comprising diabetics (28).

Viljanen et al reported that older women with declining hearingacuity had higher fall risk than those with good hearingacuity (29). Results of current study also reported that poor hearing is the second leading predictor of risk of falls in women with odds ratio 5.05 and p value <0.05.

Frequent or weekly episodes of urge incontinence in older women was reported to be independently associated with fall risk (30). Women suffering from urge incontinence had 1.76 times more likelihood of experiencing a fall event in the past year than those without incontinence (31). These studies favor our results regarding incontinence as an independent risk factor for falls with odds ratio, 5.01, p <0.01in older women.

Fear of falling was the fourth leading risk factor found in our study, It suggested fall risk to be 4.41 times more in women with fear of falling than in those without it. (OR= 4.41, p <0.05). Masud et al reported that older adults with fear of falling had increased fall risk and poorer quality of life (32).

Blake et al found no association between falls and the use of diuretics, antihypertensives or tranquillizers, however their study showed a significant association between falls and the use of hypnotics and antidepressants (33). Wild et al also reported that use of hypnotic, tranquillising, and sedative drugs increased the risk of falls (34). Burke et al. aldo reported similar results (35). Our study favors the association of antihypertensive drugs and sleeping tablets with fall risk. A study conducted by Leipzig et al showed that the older adults taking more than three or four medications were at increased risk of recurrent falls (36). Robert et al mentioned in the results of his study that the greater is the number of different drugs used, the greater is the risk of recurrent falls (37). These studies favor the results of our study showing increased fall risk due to polypharmacy. Robert et al found increased odds ratios for usage of heart tablets such as diazepam, diltiazem, diuretics,vasodilators predominantly nitroglycerin (37). Our study strongly favors the association of heart tablets with fall risk.

CONCLUSION

This cross sectional survey identified risk factors that independently predicted a significantly increased risk of falling in postmenopausal women. The most significant predictor of high risk of fall was Diabetes followed by poor hearing, incontinence, and fear of falling. Increase in risk of fall was found to be related with increasing number of risk factors.

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