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Causes and consequences of fall among elderly people at home

Causas e consequências de queda de idosos em domicílio

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Abstract

Introduction: Falls are frequent among elderly people and, as they spend most of their time at home, a place which might be safe often becomes the environment posing the biggest risk. **Objective**: Identify the causes and consequences of falls among elderly people at home, according to gender and age group, and determine which body structures are most affected. **Materials and methods**: The sample consisted of 389 elderly people living in the town of Chapecó, Santa Catarina, Brazil, with 191 women (49.10%) and 198 men (50.89%). For data collection, we used a questionnaire and an examination of the mental status. **Results**: We identified an average of 1.6 falls per year; there was an average of 1.57 for men and 1.63 for women. However, according to the age group, people over 80 years were those who suffered more falls, with an average of 2.16 per year. The place with the highest incidence of falls was the bathroom (24.94%), followed by the kitchen (18.25%). Most people reported they have suffered some kind of injury (92.03%); excoriations (46.52%) were the most common, followed by fractures (29.05%), and the sites with more episodes were the ankle (19.79%) and knee (18.25%). **Conclusion**: We found out that the occurrence of falls at home constitutes a public health problem, either due to the number of injuries and the impact they generate on the elderly health or the need for thinking of strategies to prevent these episodes at home.

Keywords: Elderly person. Fall-down accident. Housing.

Resumo

Introdução*: As quedas são frequentes nos idosos e, como eles permanecem a maior parte do tempo em domicílio, este que deveria ser um lugar seguro, torna-se muitas vezes um ambiente de maior risco.* ***Objetivos****: Identificar as causas e consequências de quedas de idosos em domicílio por gênero e faixa etária e verificar quais estruturas corporais são mais acometidas.* ***Materiais e métodos****: A amostra constituiu-se de 389 idosos residentes no município de Chapecó, sendo 191 mulheres (49,10%) e 198 homens (50,89%). Para a coleta dos dados utilizou-se um questionário adaptado de Lojudice (13) e o Miniexame do Estado Mental (12).* ***Resultados****: Foi identificada uma média de 1,6 quedas ao ano (DP ± 0,97). Uma média de 1,57 (DP ± 1,02) para homens e 1,63 (DP ± 0,91) nas mulheres. No entanto, por faixa etária, são os idosos com mais de 80 anos aqueles que mais sofreram quedas, em uma média de 2,16 (DP ± 1,34) por ano. O local de mais ocorrências de quedas foi o banheiro (24,94%), seguido da cozinha (18,25%). A maioria relatou ter sofrido algum tipo de lesão (92,03%), sendo as mais comuns as escoriações (46,52%) e as fraturas (29,05%), e a região corporal com mais episódios foi o tornozelo (19,79%) e o joelho (18,25%).* ***Conclusão****: Conclui-se que a ocorrência de quedas dentro do domicílio constitui-se em um problema de saúde pública, seja pelo número de lesões e impacto que gera na saúde do idoso ou pela necessidade de se pensar estratégias para prevenir esse evento em domicílio e no seu entorno.*

Palavras-chave*: Idoso. Acidentes por quedas. Habitação.*

Introduction

The Brazilian population is living longer. According to a survey released by the Brazilian Institute of Geography and Statistics (IBGE), within the period from 1980 to 2010, the population's life expectancy has increased over 11 years, reaching 73 years, 5 months, and 24 days (1). The increased proportion of elderly people in our population brings up the discussion on disabling events among this age group, where the occurrence of falls stands out, quite common and dreaded by most elderly people due to their consequences, especially fractures (2).

Fall may be defined as an unintentional event which results in a change in position of the individual to a lower level when compared to her/his initial position (3, 4).

The theme is very appreciated by gerontology and it is a source of concern for researchers in this area (5), since it constitutes a serious public health problem in Brazil, as around 30% of individuals aged over 65 years report falls annually, with an increase in this percentage to 51% among individuals over 85 years (6).

There are some findings which should be taken into account when it comes to elderly people and fall, one of them is that they fall more at their own home than in the street or other settings (7, 8). Over 70% of falls take place within the house, and people who live alone are at increased risk (6).

Falls can have serious physical and psychological consequences, including injuries, hospitalization, disruption of mobility, fear of falling again, activity restriction, functional decline, institutionalization, and even death (9). Currently, fractures deriving from falls represent around 70% of accidental deaths among people over 75 years. Elderly people undergo 10 times more hospitalizations and 8 times more deaths deriving from falls (10).

Elderly people often spend most of their time at home. This setting, which may be regarded as the safest one, due to familiarity, often can become a risky environment. Among home accidents, falls are the most common (70%), followed by external factors (30%). In this setting, the elderly person has a decreased readiness, due to her/his confidence to move, based on her/his knowledge on the environment where she/he lives. Attention is also decreased, because the actions she/he takes at home are routine, thus, accidents which could be easily avoided have caused disruption of mobility or functional disability. Many situations which were commonplace at young age become imminent danger (11).

A study found out that some variables increased the chance of falls among elderly people in an independent and significant way (12). These variables were previous history of fracture, being a woman, having difficulty to practice physical activities, and reporting poor or very poor vision. The literature

indicates as possible causes for an increased occurrence of falls among women the fact that they have less physical strength, when compared to men, as well as a higher prevalence of chronic diseases. It is also suspected that this fact may be related to an increased exposure to household chores and the adoption of behaviors involving a higher risk.

Given such a frequent and serious public health problem, this study seeks to contribute by bringing information on the occurrence of falls among elderly people at home, identifying their causes and consequences, so that these data can be used for planning new actions and programs which promote the prevention of falls in this environment, as well as for highlighting the need to think through the building of new housing complexes which are appropriate for the elderly population. Taking this context into account, this article aims to identify the causes and consequences of falls among the elderly people at home by gender and age group and determine which body structures are more frequently affected by falls.

Materials and methods

The research method adopted in this study was cross-sectional, quantitative, descriptive and analytical.

The elderly population in the town of Chapecó, Santa Catarina, Brazil, consists of 13,606 individuals (1). The sample had a 95% confidence interval and 5% of sampling error, totaling 389 elderly people. Data collection was organized by random drawing of 8 neighborhoods in the town and, there, we looked for the elderly individuals at their home until the sample number was reached.

We excluded from the study the elderly individuals who were not found at home after more than 3 visits by the researcher, commercial facilities, bedridden elderly individuals, those who failed to obtain an estimated outcome during a mini-examination of the mental status addressing cognition, and those who did not fall at home for the last 12 months.

The elderly individuals who participated in the study signed a free and informed consent term, in accordance with the Regulating Guidelines and Standards for Research Involving Human Beings, provided for by the Resolution 196/96, from the Brazilian National Health Council; the research was approved by the Research Ethics Committee of Universidade Comunitária da Região de Chapecó (UNOCHAPECÓ), under the Protocol 043/12. The instruments used for data collection were a mini-examination of the mental status, adapted from a proposal available in the literature (13), which evaluates temporal and spatial orientation, memory, calculation, language, and constructive skills. Then, we applied a questionnaire from another proposal available in the literature (14) to survey the causes and consequences of falls at home among elderly individuals.

The database was entered into the software *Microsoft Excel 2007*. Data analysis was performed using descriptive statistics and findings are presented here in tables, both in absolute and percentage values. Data collection was conducted in April and May 2012.

Results

Among the 389 individuals who participated in the study, we identified an average of 1.6 (± 0.97) falls per year.

Table 1 presents information about the profile of the elderly people who participated in the study. Out of the 389 elderly individuals, most were men (50.89%) and the predominant age group was from 60 to 69 years (58.09%). Most subjects were married (65.55%), with an emphasis on the literacy of almost the entire sample (96.40%), however, many of them are not retired, yet (23.13%).

Table 2 shows the causes leading to the occurrence of falls among elderly people at home. The type of flooring on which most falls took place was the rough floor (59.64%), there was no significant difference with regard to the flooring condition, either dry (46.46%) or wet (45. 24%). In most settings there were no carpets (63.49%), ramps (89.71%), or stairs (75.06%), and the lighting quality was good, i.e. bright (75.06%). Overall, the sample does not usually practice physical exercise (79.69%), and the male population is more sedentary (80.30%) than the female (79.05%). Falls took place more frequently under dry conditions (46.46%) among individuals aged from 60 to 69 years; in turn, in the groups from 70 to 79 and over 80 years, most falls occur on wet floor (49.20% and 48.65%, respectively). Almost the entire sample, 96.40%, uses medicines for chronic diseases.

Table 3 shows the consequences of falls at home among elderly individuals, and most of them reported to have suffered some kind of injury (92.03%). The most

Tabela 1 – Profile of elderly people who suffered falls at home (2012)

	Nº	%
Gender		
Male	198	50,89
Demale	191	49,10
Age (years)		
60-69	226	58,09
70-79	126	32,39
> 80	37	9,51
Marital status		
Married	255	65,55
Separated	24	6,16
Widower	59	15,16
Single	34	8,74
Divorced	17	4,38
Literate		
Yes	375	96,40
No	14	3,59
Retired		
Yes	90	23,13
No	299	76,86
Total	**389**	**100**

Source: Research data.

common were the excoriations (46.52%) and fractures (29.05%). The site most frequently affected by injuries was the ankle (19.79%), followed by knee (18.25%), and hip (14.91%). Among women, the most frequent injuries were at the ankle (21.46%), followed by hip (16.75%), and knee (16.24%). Among men, the knee (20.20%), ankle (18.18%), and head (15.15%) stood out. Regarding the age group from 60 to 69 years, the sites most frequently affected by injuries were the knee (20.79%) and ankle (20.79%). From 60 to 79 years, the most affected site was the head (19.85%), followed by hip (15.87%); in turn, for the elderly individuals between 70 and 79 and those over 80 years, the most frequently affected site was the ankle (19.05% and 16.21%, respectively), followed by the head (19.85% and 16.21%, respectively). After the fall-down accidents, a portion of the sample perceived their health as regular (38.30%) and another one as bad (3.08%).

Table 4 regarding the place where falls took place, we observed a difference by gender, where most falls among women occurred in the bathroom (24.94%), followed by the kitchen (24.08%), and, among men, the bathroom (26.10%) stood out, followed by the garden (14.15%) and the staircase (12.12%). As for the age groups from 60 to 69, 70 to 79, and over 80 years among both genders, we observed that the highest number of falls took place in the bathroom (21.63%).

Table 5 quantifies the number of falls per year occurring at home among elderly people and sets the average by age group and gender. We observed an average of 1.57 (± 2.1) for men and 1.63 (± 0.91) for women. However, by age group, those over 80 years suffered more falls, with an average of 2.16 (± 1.34) per year.

Discussion

The occurrence of falls are usual, however, the condition worsens with advancing age and health problems, causing minor injuries and even more severe fractures (8, 15).

Tabela 2 – Causes of fall at home by gender and age group (2012)

	Overall	By gender		By age group (years)		
Type of flooring	N (%)	Woman N (%)	Woman N (%)	60-69 N (%)	70-79 N (%)	> 80 N (%)
Smooth	155 (39,84)	79 (41,36)	76 (38,38)	90 (39,82)	53 (42,06)	12 (32,43)
Rough	232 (59,64)	111 (58,11)	121 (61,11)	134 (59,29)	73 (57,93)	25 (67,56)
Other	2 (0,51)	1 (0,52)	1 (0,50)	2 (0,88)	0 (0,00)	0 (0,00)
Flooring condition						
Dry	182 (46,78)	85 (44,50)	97 (48,99)	105 (46,46)	60 (47,61)	17 (45,94)
Wet	176 (45,24)	86 (45,02)	90 (45,45)	96 (42,47)	62 (49,20)	18 (48,65)
Waxed	31(7,97)	20 (10,47)	11 (5,55)	25 (11,06)	4 (3,18)	2 (5,40)
Presence of stairs						
Yes	97 (24,93)	50 (6,28)	47 (23,73)	57 (25,22)	26 (20,63)	14 (37,83)
No	292 (75,06)	141 (93,71)	151 (76,26)	169 (74,77)	100 (79,36)	23 (62,16)
Presence of ramp						
Yes	40 (10,28)	12 (6,28)	28 (14,14)	26 (11,50)	7 (5,55)	7 (18,91)
No	349 (89,71)	179 (93,71)	170 (85,85)	200 (88,49)	119 (94,44)	30 (81,08)
Lighting						
Bright	292 (75,06)	147 (76,96)	145 (73,23)	168 (74,33)	99 (78,57)	26 (70,27)
Dark	97 (24,93)	44 (23,03)	53 (26,76)	58 (25,66)	27 (21,42)	11 (29,72)
Presence of carpet						
Yes	142 (36,50)	81 (42,40)	61 (30,80)	89 (39,38)	37 (29,36)	16 (43,24)
No	247 (63,49)	110 (57,59)	137 (69,19)	137 (60,61)	89 (70,63)	21 (56,75)
Use of medicines						
Yes	357 (91,77)	176 (92,14)	181 (91,41)	201 (88,93)	120 (95,23)	36 (97,29)
No	32 (8,22)	15 (7,85)	17 (8,58)	25 (11,06)	6 (4,76)	1 (2,70)
Physical exercise						
Yes	79 (20,30)	40 (20,94)	39 (19,69)	60 (26,54)	17 (13,19)	2 (5,40)
No	310 (79,69)	151 (79,05)	159 (80,30)	166 (73,45)	109 (86,50)	35 (94,59)
Total	**389 (100)**	**191**	**198**	**226**	**126**	**37**

Source: Research data.

This study observed that individuals over 80 years were those who suffered more falls, with an average of 2.16 (SD ± 1.34) per year (16).

This study reinforces the findings of another one, which claims that individuals over 80 years are 14 times more likely to fall than independent elderly people (12).

In turn, another study with 26 elderly individuals carried out in Marília, São Paulo, Brazil, found out that the average number of falls was higher among the age group from 75 to 84 years. This fact is probably due to the fact that elderly individuals over 85 years naturally decrease their activities (17).

As indicated in the literature, people under 75 years are more likely to fall outdoors and elderly individuals over 75 years fall more frequently within their own home (18). Another study found out that the frequency of falls increases with age for those aged from 60 to 74 years (26.2%) and those over 75 years (36.9%) (19).

Regarding the type of flooring where the fall took place, in this study, the rough floor was the most usual (59.64%) and there was no significant difference with regard to the flooring condition, either dry (46.78%) or wet (45.24%), in contrast to other studies, where falls were due to slippery floor. Perhaps this fact is justified by the place falls occurred, because a significant number

Tabela 3 – Consequences of falls at home by gender and age group (2012)

Injury	Overall	By gender		By age (years)		
	N (%)	Woman N (%)	Man N (%)	60-69 N (%)	70-79 N (%)	> 80 N (%)
Yes	358 (92,03)	176 (92,14)	182 (91,91)	202 (89,38)	119 (94,44)	37 (100)
No	31 (7,96)	15 (7,85)	16 (8,08)	24 (10,61)	7 (5,55)	0 (0,00)
Type of injury						
Fractures	113 (29,05)	52 (27,22)	61 (30,80)	60 (26,55)	40 (31,74)	13 (35,13)
Sprains	67 (17,22)	36 (18,85)	31 (15,65)	40 (17,69)	23 (18,25)	4 (10,81)
Excoriations	181 (46,52)	90 (47,12)	91 (45,96)	105 (46,46)	56(44,45)	20 (54,05)
No injury	28 (7,20)	13 (6,80)	15 (7,58)	21 (9,29)	7 (5,55)	0 (0,00)
Injury site						
No injury	28 (7,19)	13 (6,80)	15 (7,57)	21 (9,30)	7 (5,55)	0 (0,00)
Head	58 (14,91)	28 (14,65)	30 (15,15)	27 (11,95)	25 (19,85)	6 (16,21)
Shoulder	19 (4,89)	6 (3,15)	13 (6,56)	10 (4,43)	5 (3,96)	4 (10,81)
Thorax	21 (5,39)	9 (4,71)	12 (6,06)	11 (4,86)	6 (4,76)	4 (10,81)
Forearm	16 (4,12)	7 (3,66)	9 (4,55)	5 (2,22)	5 (3,96)	6 (16,21)
Hands	30 (7,71)	18 (9,42)	12 (6,06)	18 (7,96)	10 (7,94)	2 (5,41)
Hip	58 (14,91)	32 (16,75)	26 (13,13)	33 (14,60)	20 (15,87)	5 (13,51)
Knee	71 (18, 25)	31 (16,24)	40 (20,20)	47 (20,79)	21 (16,66)	3 (8,12)
Ankle	77 (19,79)	41 (21,46)	36 (18,18)	47 (20,79)	24 (19,05)	6 (16,21)
Feet	11 (2,83)	6 (3,15)	5 (2, 53)	7 (3,09)	3 (2,38)	1 (2,70)
Health perception						
Great	17 (4,37)	10 (5,23)	7 (3,53)	13 (5,75)	4 (3,17)	0 (0,00)
Good	211 (54,24)	99 (51,83)	112 (56,56)	130 (57,52)	62 (49,20)	19 (51,35)
Regular	149 (38,30)	75 (39,26)	74 (37,38)	79 (34,95)	53 (42,07)	17 (45,94)
Bad	12 (3,08)	7 (3,67)	5 (2,52)	4 (1,77)	7 (5,55)	1 (2,70)
Total	**389 (100)**	**191**	**198**	**226**	**126**	**37**

Source: Research data..

of men fell in the garden (14.15%) and women in the kitchen (24.08%), places more directly related to the tasks performed, than the type of flooring.

Another study reinforces this reality (21), since most falls occurred in the garden (56%), which did not have an adequate floor.

It has also been shown in the literature that the elderly individuals suffered falls outside the house, such as in the garden and around the washtub (25.0%) (20). Data support the hypothesis that a significant number of falls is rather related to the complexity of the tasks people fulfill, the inadequate flooring, and the decreased reactions for protection and balance, some characteristics of the aging process, instead of the type of floor by itself.

A study found out that the place where the elderly individuals fall more frequently is the bathroom (33.3%), followed by the bedroom and the living room (16.7%) (14). Several studies show that elderly subjects tend to suffer more falls at home (6, 22) and at the most used settings (23). A lower number of falls outside these environments may be due to the decreased sociability of some elderly individuals (24). However, another factor which may influence on this issue is fear of falling again, since most elderly people, after a certain age, suffer around 1 fall each year.

Regarding gender, a difference is observed on the place of falls. Among women, most falls occur in the bathroom (24.94%), followed by the kitchen (24.08%), and among men the bathroom (26.10%) stands out, followed by garden (14.15%). As for the age groups from 60 to 69, 70 to 79, and over 80 years, for both sexes, we observed that the highest number of falls occur in the bathroom (26.10%). Some

Tabela 4 – Place of falls at home by gender and age (2012)

Place of falls	Overall	By Gender		By age (years)		
	N (%)	Women N (%)	Man N (%)	60-69 N (%)	70-79 N (%)	> 80 N (%)
Bathroom	97 (24,94)	53 (27,75)	44 (22,22)	59 (26,10)	30 (23,80)	8 (21,63)
Room	41 (10,53)	22 (11,52)	19 (9,59)	30 (13,27)	10 (7,94)	1 (2,70)
Living room	43 (11,05)	19 (9,95)	24 (12,12)	28 (12,38)	13 (10,31)	2 (5,40)
Kitchen	71 (18,25)	46 (24,08)	25 (12,62)	41 (18,15)	25 (19,85)	5 (13,51)
Balcony	2 (0,51)	0 (0,00)	2 (1,01)	0 (0,00)	1 (0,79)	1 (2,70)
Garden	32 (8,22)	4 (2,10)	28 (14,15)	18 (7,96)	9 (7,15)	5 (13,51)
Service area	18 (4,62)	11 (5,75)	7 (3,54)	5 (2,22)	8 (6,34)	5 (13,51)
Sidewalk	27 (6,95)	14 (7,32)	13 (6,56)	17 (7,52)	6 (4,76)	4 (10,82)
Corridor	17 (4,37)	5 (2,62)	12 (6,06)	5 (2,22)	11 (8,74)	1 (2,70)
Staircase	41 (10,55)	17 (8,90)	24 (12,12)	23 (10,17)	13 (10,31)	5 (13,51)
Total	**389 (100)**	**191**	**198**	**226**	**126**	**37**

Source: Research data.

Tabela 5 – Falls at home by age group and gender (2012)

Age group	Number of falls	Avarage(SD)
60 a 69	348	1,54 (± 0,88)
70-79	193	1,53 (± 0,94)
+ 80 years	80	2,16 (± 1,34)
Gender		
Women	311	1,63 (± 0,91)
Men	310	1,57 (± 1,02)

Source: Research data.

findings reported in the literature are similar to those of this study, since it was found out that among falls within home, most took place in the bathroom (38.1%) and the environment was adequately provided with light (85.9%) (25).

Among the reports of falls within home, the bathroom was the most cited setting in both sexes. These results partly differ from those observed in other studies, where the occurrence of falls is mainly concentrated in the kitchen (14, 26). Perhaps, the occurrence of falls is more related to the tasks by gender, whereas women had a significant number of falls in the kitchen, a place where they remain longer than men, and the latter spend more time in the garden, which is often the locus of their tasks. There is a need for further studies with a deeper analysis of this issue of gender, the occurrence of falls, and daily life activities, even for leading the preventive programs to start taking this variable into account in the guidelines on the safe house for elderly people.

The findings of another study (27) differ from our results, highlighting that falls within home occur in the most frequently used settings, i.e. the bedroom (21.4%), the kitchen (19.1%), and the living room (27.4%) (28).

Other authors corroborate that, since it is the environment where the elderly individual spends most of her/his time, the primary location where falls occur is at home, and the risk of suffering a fall at home increases with advancing age (29,30).

In this study, most people reported to have suffered some kind of injury (92.03%) and the most usual were excoriations (46.52%) and fractures (29.05%).

Another author states that most falls among elderly individuals leads to minor injuries or no injury (31). However, falls are a matter of concern, considering the high proportion of elderly people who suffered excoriations and lacerations as a consequence of the impact caused by the fall.

Similar results were found in the literature, and the main consequences of falls were scratches, abrasions, bruises, and lacerations without suturing (32). However, falls do not lead only to these kinds of injury; 5% to 10% of them can result in more severe injuries. This factor constitutes a matter of concern, because fractures among elderly individuals can lead to a major dependence condition, depending on the extent and location of the lesion, with a long hospitalizat stay, according to the surgical procedure required, therefore, findings such as those of this study, where nearly 30% of a sample of 389 elderly people suffered fractures after a fall, constitute a major concern for the health care system.

Most of the sample does not usually practice physical exercise (79.69%), and most of the male population is sedentary (80.30%). The daily practice of physical activity and exercise contributes to the prevention of falls, since researches suggest that a physical exercise program for increasing strength keeps body composition and weight effective with regard to locomotion and that it also improves the balance, thus decreasing the occurrence of falls among elderly people (28).

Physical activity is a therapeutic mode which improves physical mobility and postural stability, which are directly related to the prevention of falls (33).

The sedentary lifestyle during old age is a factor which further contributes to the deterioration of postural control (34, 35), and this significantly increases the risk of falls, therefore, physical exercise contribute to minimize changes of the aging process and it is important for keeping functional capacity and a good health status, besides protecting the elderly individual with regard to the occurrence of falls. This study found out that almost the entire sample (96.40%) uses medicines for chronic diseases.

The relationship between the use of medicines and falls has been investigated in the literature. Studies show that, although it is not possible to ascertain the relationship between falls and medicines, the use of medicines increases the risk of falls, especially among rather frail elderly individuals or those using more severe drugs (36). Another study found out an association between the need to use medicines on a continued basis and the occurrence of falls (37).

Conclusion

We conclude that the place with more occurrences of falls was the bathroom (24.94%), followed by the kitchen (18.25%) among women; among men, the prevailing setting was the bathroom (26.10%), followed by the garden (14,15%) and the staircase (12.12%). Still, most individuals suffered some kind of injury (92.03%), and the most frequent ones are excoriations (46.52%), followed by fractures (29.05%), and the body region with more episodes was the ankle (19.79%) and knee (18.25%). However, there was no significant difference with regard to the flooring condition where the fall occurred, either dry (46.46%) or wet (45.24%). Women suffer more falls per year than men, on average 1.6 (SD ± 0.97). Nevertheless, the age group over 80 years has more events involving falls per year, 2.16 (SD ± 1.34). Most of the sample does not practice physical exercise (79.69%), and the male population is more sedentary (80.30%).

The data draw attention due to the number of fractures deriving from falls and the various possibilities involved in the occurrence of falls, something which leads us to highlight the need for further studies on this theme, aiming to highlight their relation to everyday activities, their function in everyday life, and gender. Moreover, prevention programs must pay attention to these issues.

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