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FATORES ASSOCIADOS À ADAPTAÇÃO DO DOMICÍLIO EM IDOSOS: ESTUDO OBSERVACIONAL EM CUIDADOS DE SAÚDE PRIMÁRIOS

FACTORS ASSOCIATED WITH HOME ADAPTATION IN OLDER ADULTS: AN OBSERVATIONAL STUDY IN PRIMARY HEALTH CARE

FACTORES ASOCIADOS A LA ADAPTACIÓN DEL DOMICILIO EN PERSONAS MAYORES: ESTUDIO OBSERVACIONAL EN ATENCIÓN PRIMARIA DE SALUD

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RESUMO

Introdução: O envelhecimento da população exige respostas eficazes que promovam uma vida segura e independente dos idosos no domicílio. A adaptação física do ambiente doméstico é uma estratégia reconhecida na prevenção de eventos adversos e no apoio à funcionalidade dos idosos.

Objetivo: Identificar os fatores associados às adaptações físicas no domicílio de idosos com 80 ou mais anos, no contexto dos cuidados prestados por enfermeiros de família.

Métodos: Estudo observacional, retrospectivo e analítico, baseado nos registros clínicos de 158 idosos com 80 ou mais anos acompanhados por enfermeiros de família durante o ano de 2024. A análise incluiu estatística descritiva, análise bivariada e regressão logística binária.

Resultados: Apenas 13,9% dos idosos apresentavam adaptações no domicílio. A análise multivariada identificou como preditores significativos: maior dependência funcional, presença de doença respiratória e apoio institucional. A maioria das adaptações ocorreu em resposta a limitações já instaladas.

Conclusão: Este estudo identificou a dependência funcional, a doença respiratória e o apoio institucional como fatores-chave associados à adaptação do domicílio em idosos. Os resultados reforçam a necessidade de transitar de uma abordagem reativa para estratégias preventivas nos cuidados de saúde primários, valorizando o papel dos enfermeiros de família na identificação precoce e intervenção.

Palavras-chave: ambiente domiciliar; idoso; envelhecimento em casa; estado funcional; enfermagem

ABSTRACT

Introduction: Population aging requires effective responses that promote the safe and independent living of older adults at home. Physical adaptation of the home environment is a recognized strategy for preventing adverse events and supporting the functionality of older adults.

Objective: To identify the factors associated with the physical adaptations of homes for older adults aged 80 and older, in the context of care provided by family nurses.

Methods: This observational, retrospective, and analytical study was based on the clinical records of 158 older adults aged 80 years or older who were followed by family nurses throughout the year 2024. The analysis included descriptive statistics, bivariate analysis, and binary logistic regression.

Results: Only 13.9% of older adults had home adaptations. The multivariable analysis identified functional dependence, respiratory disease, and institutional support as factors significantly associated with home adaptation. Most adaptations occurred after functional or clinical limitations were already present.

Conclusion: This study identified functional dependence, respiratory disease, and institutional support as key factors associated with home adaptation in older adults. The findings highlight the need to shift from reactive to preventive strategies in primary care, reinforcing the role of family nurses in early identification and intervention.

Keywords: home environment; aged; aging in place; functional status; nursing

RESUMEN

Introducción: El envejecimiento de la población exige respuestas eficaces que promuevan una vida segura e independiente de las personas mayores en el hogar. La adaptación física del entorno doméstico es una estrategia reconocida para prevenir eventos adversos y apoyar la funcionalidad de las personas mayores.

Objetivo: Identificar los factores asociados a las adaptaciones físicas en el hogar de personas mayores de 80 años o más, en el contexto de los cuidados prestados por enfermeros de familia.

Métodos: Estudio observacional, retrospectivo y analítico, basado en los registros clínicos de 158 personas mayores de 80 años o más seguidas por enfermeros de familia durante el año 2024. El análisis incluyó estadística descriptiva, análisis bivariado y regresión logística binaria.

Resultados: Solo el 13,9% de las personas mayores tenía adaptaciones en el hogar. El análisis multivariado identificó como predictores significativos: mayor dependencia funcional, presencia de enfermedad respiratoria y apoyo institucional. La mayoría de las adaptaciones se realizaron en respuesta a limitaciones ya existentes.

Conclusión: Este estudio identificó la dependencia funcional, la enfermedad respiratoria y el apoyo institucional como factores clave asociados a la adaptación del hogar en personas mayores. Los resultados refuerzan la necesidad de pasar de un enfoque reactivo a estrategias preventivas en la atención primaria, destacando el papel de los enfermeros de familia en la identificación e intervención tempranas.

Palabras clave: ambiente en el hogar; anciano; envejecimiento en el hogar; estado funcional; enfermería

INTRODUCTION

Population ageing has emerged as one of the most striking demographic changes in recent decades, presenting new challenges to health systems and care models. With the increase in average life expectancy, it is essential to promote conditions that enable older people to live safely and autonomously at home (Carnemolla & Bridge, 2019; Valipoor et al., 2020).

The physical adaptation of the home, through the installation of ramps, accessible bathrooms, handrails, or support equipment, has been identified as an effective strategy for reducing the risk of falls, preventing early institutionalization, and facilitating older adults' stay in their usual environment (Keall et al., 2015; Stark et al., 2017).

The factors that influence the decision to adapt the home are diverse and remain the subject of debate. Functional limitation has been widely referred to as a central determinant (Campani et al., 2020), but other factors, such as socioeconomic status, the presence of institutional support, and certain medical conditions, also seem to play a relevant role in the decision to intervene in the home space (Keall et al., 2015; Valipoor et al., 2020).

Few studies analyse this issue within the context of primary health care in Portugal, particularly regarding family nurses' role in monitoring older adults' living conditions. Understanding the factors influencing home adaptations could contribute to more effective policies promoting autonomy and preventing dependency.

Conceptually, home adaptation in primary health care can be understood as a continuum spanning preventive action (anticipating risks), rehabilitative response (addressing functional decline), and social care support (enabling ageing in place through environmental adjustments). In practice, however, adaptations often occur reactively, after functional deterioration or clinical events, which may limit their preventive potential. This conceptual positioning justifies the focus of the present study on functional status, clinical conditions, and social/institutional support as determinants of home adaptation. Family nurses are central actors in this process not merely due to data availability, but because they routinely assess functional status and home safety, identify environmental risks during follow-up, and frequently act as mediators between older adults, informal carers, and social support services when adaptations are indicated. Despite the policy relevance of ageing-in-place in Portugal, evidence from primary care nursing contexts remains limited regarding which clinical, functional, and social determinants are most strongly associated with the decision to adapt the home—particularly whether adaptation reflects a predominantly reactive logic. By examining these determinants using routinely collected clinical data, this study adds empirical insight that may inform nursing decision-making and targeted preventive strategies in primary health care (Carnemolla & Bridge, 2019, 2020; Keall et al., 2015; Stark et al., 2017; Campani et al., 2020).

In this context, this study aims to identify the determinants associated with the physical adaptation of the home in older adults aged 80 and over, in the context of care provided by family nurses.

1. THEORETICAL FRAMEWORK

The aging population has driven the need for strategies to promote the safe and autonomous living of older adults in their homes. Physical home adaptation emerges as a priority in person-centred care, particularly considering the risks of falls, functional decline, and chronic diseases (Keall et al., 2015; Stark et al., 2017).

Interventions to modify the home environment - such as installing handrails, removing architectural barriers, and adapting sanitary facilities - effectively promote safety, reduce early institutionalisation, and reduce the burden on carers (Carnemolla & Bridge, 2019). However, evidence consistently indicates that implementation is frequently reactive, occurring after functional or clinical decline, rather than being systematically promoted as a preventive strategy. (Carnemolla & Bridge, 2020).

The evidence suggests that the determinants of home adaptation are multifactorial. Functional limitation has consistently been identified as one of the main predictors, reflecting the growing need for physical support as autonomy decreases (Campani et al., 2020; Stark et al., 2017). Social factors, including family or institutional support and clinical conditions, influence this decision significantly. The need to adapt living spaces is often associated with chronic illnesses, which can impact the mobility and safety of older adults in their environment (Valipoor et al., 2020). Simultaneously, the effectiveness of modifications can depend on the active involvement of family or institutional caregivers, who reinforce safe behaviours and promote adapted environments (Campani et al., 2020).

In line with ageing-in-place policies, the decision to implement home adaptations may be conceptualised as the result of interacting functional, clinical, and social determinants. In this study, we assumed a parsimonious framework in which (i) functional status (Barthel Index) represents the need for assistance and environmental support; (ii) clinical burden (e.g., respiratory disease) represents condition-specific mobility and safety demands; and (iii) social/institutional resources (family and institutional support, economic insufficiency) represent the feasibility and facilitation of implementing adaptations. These determinants may act independently or jointly to influence whether adaptations are implemented, and they are consistent with the frequently described reactive pathway in which adaptations follow established limitations rather than preceding them (Carnemolla & Bridge, 2019, 2020; Keall et al., 2015; Stark et al., 2017; Campani et al., 2020).

Modifying the environment has been analysed from the perspective of safety and as a promoter of participation and well-being for older adults, especially in community contexts (Valipoor et al., 2020). Thus, the concept of aging in place is gaining relevance, implying the need for public policies that integrate health, housing, and social support in a proactive manner (Carnemolla & Bridge, 2020).

Despite these advances, the international literature highlights a significant gap in studies conducted within the context of primary healthcare and the specific role of family nurses in the early identification of housing risks and the promotion of adaptations (Stark et al., 2017). In Portugal, growing interest in home adaptation to improve quality of life and functionality for older adults reflects a promising field for further research and innovation.

2. METHODS

2.1 Study design

This is an observational, retrospective, and analytical study to identify the factors associated with physical adaptations in the homes of older adults aged 80 and over. This study adhered to the RECORD checklist, an extension of the STROBE guidelines, which aims to improve the transparency and quality of reporting studies using routinely collected health data (Benchimol et al., 2015).

2.2 Population and sample

The target population included older adults registered in northern Portugal on three family nurse lists.

The sample was selected for convenience and consisted of 158 older adults aged 80 years or over who remained living at home throughout the year of 2024 and were registered on the lists of the participating family nurses.

Older adults who were institutionalised or hospitalised at any point during 2024 were excluded.

Because the sample was drawn from three family nurse lists using a convenience approach, it may not fully represent all community-dwelling older adults in primary care. In particular, individuals under regular family nursing follow-up may include a higher proportion of older adults with functional vulnerability or complex care needs, which could inflate the observed relevance of functional and clinical determinants. Accordingly, the findings should be interpreted as most applicable to older adults routinely monitored in primary care nursing practice rather than to the entire older population.

2.3 Data collection

The data were collected retrospectively by analysing the computerised clinical records made by the family nurses in 2024.

The variables were extracted systematically using a structured collection grid previously validated by the researchers. The data were anonymised according to the ethical and legal principles before analysis.

2.4 Variables analysed

The dependent variable was the presence of physical adaptation in the home (yes/no), defined as any modification to the home environment that improves mobility, safety, or accessibility for older adults (e.g., ramps, adapted bathrooms, handrails, stair lifts). We acknowledge that home adaptations vary substantially in type, cost, and complexity; however, the routinely collected clinical records did not consistently capture this level of detail. Therefore, operationalising home adaptation as a binary outcome may have resulted in some loss of granularity and potential misclassification, particularly if minor informal modifications were under-recorded or if the funding or implementation pathway (clinically prescribed, socially funded, or informally implemented) was not documented. This limitation is inherent to the use of routinely collected data and was considered in the interpretation of the findings.

The independent variables included the Barthel Index (0-100) as a measure of functional dependence, the presence of institutional support for daily care (yes/no), and the presence of respiratory disease (yes/no).

Family support was recorded as a dichotomous variable (yes/no), based on the presence of an identified informal caregiver or family member providing regular assistance, according to local health unit criteria. Economic insufficiency was classified according to administrative records indicating eligibility for social or financial support.

Additional clinical variables, including cardiac, osteoarticular, neurological, and mental diseases, were also collected to characterise the sample and were considered in the bivariate analysis.

2.5. Statistical analysis

The data were analysed using IBM SPSS Statistics® software, version 29.0.

Descriptive analysis was performed using measures of central tendency and dispersion appropriate to each variable type.

Although median values were calculated for non-normally distributed variables, the mean and standard deviation were reported to allow comparison with existing literature and to support subsequent regression modelling. The normality of continuous variables was assessed using the Shapiro–Wilk test.

The following tests were used for the bivariate analysis: Pearson’s chi-squared test or Fisher’s exact test for categorical variables, and the Mann–Whitney U test for comparing non-normally distributed continuous variables.

Binary logistic regression was then carried out using the enter method to estimate the predictors of home adaptation. The B coefficients, odds ratios (Exp(B)), and 95% confidence intervals (95% CI) were reported.

Formal collinearity diagnostics (e.g., variance inflation factors) were not performed. Variable selection for the multivariable model was guided by clinical plausibility, results of the bivariate analysis, and conceptual considerations. Predictors showing clear conceptual overlap with functional status were excluded to minimise redundancy and preserve the interpretability of the final model.

The quality of the model was assessed using the Hosmer–Lemeshow and Omnibus tests, as well as the Cox & Snell and Nagelkerke R² coefficients. The level of statistical significance was set at $p < 0.05$.

2.6 Ethical considerations

The study respected the ethical principles of health research and guaranteed data anonymization. This study used secondary data, with no direct intervention on the participants, so obtaining individual informed consent was unnecessary. The study was approved by the Ethics Committee of the Local Health Unit of Médio Ave (Approval Reference: 32/2024).

3. RESULTS

3.1 Sample Characterisation

Table 1 shows the sample characterisation included in this study. The sample consisted of 158 older adults aged 80 or over, living at home and accompanied by family nurses in northern Portugal.

The average age was 89.2 (SD = 3.6), ranging from 81 to 100. Most participants were female (62%).

Only 22 older adults (13.9%) had physical adaptations at home, defined as the presence of ramps, adapted bathrooms, handrails, or mobility support equipment.

About functionality, the Barthel Index showed a mean score of 81.2 (SD = 27.1), with values indicating a predominance of high functional autonomy within the sample.

In total, 43 older adults (27.2%) received institutional support for daily care, and 22 older adults (13.9%) had respiratory pathologies on record.

According to the local health unit's criteria, most older adults (96.8%) had regular family support, and around 51% were in economic insufficiency.

Table 1 - Sample Characteristics

Variable	N (%) or mean $\pm$ SD
Age (years)	89.2 $\pm$ 3.6
Gender:	
Female	98 (62.0%)
Male	60 (38.0%)
Adapting the home	22 (13.9%)
Barthel Index (mean $\pm$ SD)	81.2 $\pm$ 27.1
Institutional support	43 (27.2%)
Family support	153 (96.8%)
Economic insufficiency	80 (50.6%)
Respiratory disease	22 (13.9%)
Cardiac disease	63 (39.9%)
Osteoarticular disease	56 (35.4%)
Neurological disease	31 (19.6%)
Mental disease	24 (15.2%)

Note. Data is presented as mean $\pm$ standard deviation (SD) for continuous variables and as absolute number (N) and percentage (%) for categorical variables.

3.2 Bivariate analysis

Statistically significant associations were observed between home adaptation and functional status, respiratory disease, institutional support, neurological disease, and mental disease (Table 2).

Table 2 - Association between sociodemographic, clinical, and functional variables and the presence of home adaptation

Variable	p-value
Barthel Index	< 0.001
Respiratory disease	0.009
Institutional support	0.038
Sex	0.112
Economic insufficiency	0.140
Family support	1.000
Neurological disease	0.007
Mental disease	0.019

Notes: Statistically significant associations were identified at $p < 0.05$.

3.3 Final model

A binary logistic regression was constructed to identify the main predictors of home adaptation in older adults.

The final model included three independent variables: Barthel index, institutional support, and presence of respiratory disease. The model was statistically significant ($\chi^2(3) = 20.04$; $p < 0.001$) and showed a good fit to the data (Hosmer-Lemeshow: $p = 0.767$). The explanatory power was moderate (Nagelkerke $R^2 = 0.215$), with an overall correct classification rate of 86.7%.

Although higher Barthel scores indicate greater functional autonomy, the observed association (OR = 1.023 per point) represents a small effect size and should be interpreted cautiously. One plausible explanation is that home adaptations may be implemented while older adults still retain substantial autonomy, functioning as enabling modifications that help maintain independence rather than as late responses to severe dependence. Alternatively, this pattern may reflect documentation artefacts in routinely collected records, where adaptations are more likely to be recorded among older adults actively engaged with services and home follow-up, or residual confounding not fully captured by available variables. To support clinical interpretation, the odds ratio implies that a 10-point difference in the Barthel Index corresponds approximately to a 26% increase in the odds of home adaptation ($1.023^{10} \approx 1.26$), which remains modest and reinforces the need to consider both statistical and practical significance.

Some variables, such as neurological disease and mental illness, showed a significant association in the bivariate analysis; they were excluded from the final model because they did not maintain statistical significance when adjusted for other covariates. This decision was based on the principle of statistical parsimony and the conceptual overlap with the functional variable (Barthel index), ensuring the robustness of the model and the clinical coherence of the predictors included.

Respiratory disease was included in the multivariable model because it showed a statistically significant association with home adaptation in the bivariate analysis and presented the strongest effect size among the clinical variables. Additionally, respiratory conditions often entail mobility limitations and environmental demands that directly justify structural home modifications, supporting its clinical relevance in the final model despite lower prevalence compared to other conditions.

Table 3 shows the estimated coefficients of the model, the odds ratios (OR), and the respective 95% confidence intervals (95% CI).

Table 3 - Binary logistic regression model for predictors of home adaptation in older adults

Variable	B	p	OR (Exp(B))	95%CI OR
Barthel Index	0.023	0.003	0.023	1.008 – 1.039
Institutional support (yes)	-1.081	0.041	0.339	0.120 – 0.957
Respiratory disease (yes)	1.508	0.012	4.519	1.389 – 14.704

Note. B = estimated logistic regression coefficient; p = significance value; OR = odds ratio; 95%CI OR = 95% confidence interval for the odds ratio. $p < 0.05$ is considered statistically significant.

4. DISCUSSION

This section interprets the study's main results in the light of scientific literature, relating them to the theoretical framework, discussing practical implications, and recognising limitations.

Validation of results with previous studies

The results of this study show that the decision to adapt the home is significantly associated with older adult functionality, institutional support, and respiratory disease.

The Barthel index, which assesses autonomy in activities of daily living, proved to be a statistically significant predictor of adaptation to the home environment. This result corroborates the literature that links functional dependence with increased need for physical support at home (Carnemolla & Bridge, 2019; Stark et al., 2017). Carnemolla and Bridge (2020) reported that adapting the home space directly promotes the safe stay of older adults in their homes, reducing dependence on formal carers.

The direction and magnitude of the Barthel association warrant careful consideration. While functional limitation is commonly described as a trigger for adaptations, our findings may indicate that adaptations are sometimes introduced as enabling measures before severe dependence emerges, supporting autonomy and safety. Nevertheless, alternative explanations cannot be excluded, including differential recording in routine clinical documentation, selection effects inherent to convenience sampling from family nurse lists, and residual confounding. Future studies using prospective designs and more granular adaptation measures (type, cost, and implementation pathway) are needed to disentangle whether adaptation is preventive, reactive, or both within primary care nursing practice.

The role of institutional support

The presence of institutional support was inversely associated with the absence of adaptations, which may suggest a possible facilitating role of formal support structures in enabling home modifications. However, given the observational and retrospective design, this interpretation should remain cautious, as institutional support may also be a proxy for unmeasured need, service engagement, or referral pathways. This association may reflect the joint action between the social/institutional network and the clinical needs of older adults. This aspect is less documented in the literature but indirectly pointed out by authors such as Campani et al. (2020), who emphasise the role of environmental interventions in contexts to prevent falls and domestic risks.

Highlighting respiratory disease

Respiratory disease was the most robust predictor of home adaptations, possibly reflecting the need to optimise physical space for older people with respiratory limitations and reduced mobility. Previous studies point out that modifications to the home environment, including air circulation, accessibility, and functional layout, are crucial for people with chronic respiratory conditions (Keall et al., 2015; Valipoor et al., 2020). These results reinforce the importance of proactive planning of physical space adaptation when clinical impairment exists.

Reactive versus preventive intervention

Carnemolla and Bridge (2020) describe home adaptation as often carried out reactively, after adverse events or apparent functional decline. In this study, the low proportion of adapted homes (13.9%) and the strong association with the presence of diseases and loss of functionality suggest that this trend persists in the Portuguese context.

Despite the recognised benefits of a preventative approach (Keall et al., 2015), the data show that adaptation tends to occur only when clinical conditions have already set in, which limits the potential of environmental modification as a strategy for promoting autonomy.

Practical and political implications

From a primary care nursing perspective, these findings support three actionable directions. First, integrating structured home-risk screening into routine family nursing follow-up for very old adults may help identify candidates for early adaptation before major decline occurs. Second, developing clear referral pathways between family nurses, social services, and municipal housing support programmes could reduce delays and improve equity in access to adaptations, particularly for older adults with economic insufficiency. Third, documenting adaptations more systematically in clinical records (including type and implementation pathway) would strengthen continuity of care and enable monitoring of outcomes such as falls, functional trajectories, and institutionalisation.(Stark et al., 2017).

Limitations of the study

This study has limitations inherent to its retrospective design, which makes it impossible to establish causal relationships between the factors identified and the occurrence of home adaptation.

The sample was selected for convenience, which may limit the generalisability of the results. In addition, because participants were drawn from three family nurse lists, the sample may overrepresent older adults who are more frequently monitored or who have higher care needs, limiting external validity. Therefore, the results should be generalised primarily to similar primary care nursing settings rather than to all community-dwelling older adults. However, the systematic collection of data from computerised clinical records throughout 2024 ensured the completeness of the information and reduced the risk of observation bias. Future studies could use longitudinal methodologies and data triangulation to better understand the decision-making processes related to adapting the home environment.

CONCLUSION

This study, conducted in the context of family nursing care, identified factors associated with physical adaptations in the homes of older adults aged 80 and over. The results showed that functional dependence, institutional support, and respiratory disease were significantly associated with changing the home environment.

The low prevalence of adapted homes suggests that the decision to implement structural changes continues to occur reactively, often after the clinical condition has worsened, rather than being promoted as a preventative strategy.

These results reinforce the importance of systematic functional assessment, intersectoral liaison between health and social support, and the availability of technical and financial resources for early interventions at home.

By identifying functional, clinical, and social determinants of home adaptation within a primary care family nursing context, this study contributes evidence to support earlier, more targeted, and potentially preventive decision-making for ageing in place. Future longitudinal and multicentre studies could examine the impact of these adaptations on the autonomy, safety, and quality of life of older adults and their need for formal and informal care.

AUTHORS' CONTRIBUTION

Conceptualization, T.A. and S.P.; data curation, S.P., H.A., R.C. and A.A.; formal analysis, T.A.; investigation, T.A., S.P., H.A., R.C. and A.A.; methodology, T.A. and S.P.; project administration, T.A. and S.P.; software, T.A.; supervision, T.A.; validation, T.A. and S.P.; visualization, S.P.; writing – original draft, T.A. and S.P.; writing – review & editing, T.A.

CONFLICT OF INTERESTS

The authors declare no conflict of interests.

REFERENCES

- Benchimol, E. I., Smeeth, L., Guttman, A., Harron, K., Moher, D., Petersen, I., Sorensen, H. T., von Elm, E., & Langan, S. M. (2015). The REporting of studies Conducted using Observational Routinely-collected health Data (RECORD) statement. *PLoS Medicine*, 12(10), e1001885. <https://doi.org/10.1371/journal.pmed.1001885>
- Campani, D., Caristia, S., Amariglio, A., Piscione, S., Ferrara, L. I., Barisone, M., Bortoluzzi, S., Faggiano, F., Dal Molin, A., & Group, I. W. (2020). Home and environmental hazards modification for fall prevention among the elderly. *Public Health Nursing* 38(3), 493. <https://doi.org/10.1111/phn.12852>
- Carnemolla, P., & Bridge, C. (2019). Housing design and community care: How home modifications reduce care needs of older people and people with disability. *International Journal of Environmental Research and Public Health*, 16(11), 1951. <https://doi.org/10.3390/ijerph16111951>
- Carnemolla, P., & Bridge, C. (2020). A scoping review of home modification interventions—Mapping the evidence base. *Indoor and Built Environment*, 29(3), 299-310. <https://doi.org/10.1177/1420326X18761112>
- Keall, M. D., Pierse, N., Howden-Chapman, P., Cunningham, C., Cunningham, M., Guria, J., & Baker, M. G. (2015). Home modifications to reduce injuries from falls in the home injury prevention intervention (HIPI) study: a cluster-randomised controlled trial. *The Lancet*, 385(9964), 231-238. [https://doi.org/10.1016/S0140-6736\(14\)61006-0](https://doi.org/10.1016/S0140-6736(14)61006-0)
- Stark, S., Keglovits, M., Arbesman, M., & Lieberman, D. (2017). Effect of home modification interventions on the participation of community-dwelling adults with health conditions: A systematic review. *The American Journal of Occupational Therapy*, 71(2), 7102290010p7102290011-7102290010p7102290011. <https://doi.org/10.5014/ajot.2017.024521>
- Valipour, S., Pati, D., Kazem-Zadeh, M., Mihandoust, S., & Mohammadigorji, S. (2020). Falls in older adults: a systematic review of literature on interior-scale elements of the built environment. *Journal of Aging and Environment*, 34(4), 351-374. <https://doi.org/10.1080/26892618.2020.1743046>