



## Gender-based inequalities in the effects of housing on health: A critical review

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### ABSTRACT

Gender and its power relations are produced and reproduced in the housing sphere, leading to inequalities in living conditions and, therefore, in gender inequalities in health outcomes. The aim of the study is to review the published literature on gender, housing and health, to critically evaluate the incorporation of the gender perspective, and to incorporate this perspective into the conceptual framework of housing and health. Using the critical review method, we conducted a literature review in MEDLINE, Scopus, WOS and Redalyc, without restriction of publication date, including studies published up to October 2020. We analyzed the gender perspective in health research using the Gender Perspective in Health Research Questionnaire and described the results according to main housing dimensions. Of the 20,988 articles identified, we selected 90 for full-text analysis, of which 18 were included in the feminist research category, 27 in gender-sensitive, 31 in sex difference and 14 did not include any gender perspective. Regarding the association between housing and health, most studies analyzed affordability (36%) and physical conditions (32%), and trends in health outcomes by gender varied according to each exposure analyzed, although overall the effects were worse for women and non-binary or trans people. To date, very few studies consider the gender perspective. It is urgent to address gender relations in housing and health studies, and to open an interdisciplinary and intersectoral agenda to address this complex relationship.

### 1. Introduction

Housing is more than just four walls and a roof. In addition to the material and economic dimensions, it is also a space for the construction of subjectivities, which gives meaning to the vital experiences of people (Merton, West, Jahoda, & Selvin, 1963; Rugiero, 2000). In consequence, housing has been considered a central element for people's well-being and, therefore, as a fundamental human right that implies access to adequate, safe and affordable housing, in an environment that allows people's development (Gledhill, 2010; ONU, 1948; R. 4.eneral C, 2014). However, currently more than 1.6 billion people in the world lack adequate housing (20% of the world's population) and, it is estimated, that annually about 2 million people are formally evicted from their homes (UN-Habitat, 2020). The COVID-19 pandemic has affected the most disadvantaged sectors of the population to a greater extent, increasing social inequalities, gender violence and poverty worldwide,

situations that have further aggravated the housing crisis (UN-Habitat, 2020; UN-Women, 2020).

Feminist theories have highlighted the importance of gender to understand social functioning (Butler, 1998; Satsangi, 2011). Gender, in contrast to sex which refers to the biological characteristics of individuals, is considered as a social structure that produces and reproduces the norms and roles associated with sexual differences and, at the same time, expresses the power relations that exist between these differences (Butler, 1998; Connell, 2012; Rubin and Reiter, 1975). Therefore, it is a central element in understanding the different structures that shape societies (Butler, 2001). Housing is not an exception, where the gender constructs also operate, are replicated and maintained, leading to differences in living conditions and, therefore, in health between the different genders (Saarikangas, 1993; Satsangi, 2013). In the current housing crisis, gender inequalities are evident: according to data from UN-Habitat (-Habitat-Women. Har, 2020), in

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middle-income countries, women between 15 and 49 years of age are over-represented in slum or slum-like settlements. In the case of the European Union, for example, it is estimated that the risk of poverty after deducting housing costs increases considerably for both women and men, but the gender gap remains constant and even increases slightly (from 10% to 33% in women, and from 9% to 29% in men) (Barbieri et al., 2016).

The housing phenomenon and its impact on people's health has been widely addressed (Downing, 2016; Gibson et al., 2011; Oliveras et al., 2007; Pevalin, Reeves, Baker, & Bentley, 2017; Tsai, 2015; Vázquez-Vera et al., 2017). Different conceptual frameworks point to housing as a social determinant of health (Bonney, 2007; Borrell et al., 2012; European Centre for E, 2012; Novoa et al., 2014); for example, the framework proposed by Novoa et al. (Novoa et al., 2014) defines structural dimensions that determine access to adequate housing: on the one hand the welfare state, labor market and social security policies; and on the other hand, the housing system (based on the market and the public policies). Subsequently, at an intermediate level, housing sphere is divided between the house and the neighborhood. In the house there must be considered the physical conditions and legal, economic and emotional conditions. The neighborhood sphere is separated between the physical environment and the community. Finally, they indicate that all the dimensions influence the people's health, modulated according to the axes of inequality that are combined in each case, including gender.

Despite of that, to date there has been no in-depth study of how gender, as a power device (Pujal & Amigot, 2010), affects the health processes associated with housing. Several studies in this field have observed negative effects on mental health -e.g. anxiety, depression, suicide- and physical health -e.g. heart problems, premature mortality- (Downing, 2016; Oliveras et al., 2007; Tsai, 2015; Vázquez-Vera et al., 2017), but there is still a lack of a gender approach of these problems. In fact, a recent umbrella review analyzed 124 systematic reviews addressing the relationship between health and urban housing (Turcu et al., 2021). This found that one of the gaps in the literature was the lack of attention to gender issues and the intersection of gender with other axes of inequity. Without sufficient studies that address this relationship, it is not possible to analyze inequalities in health outcomes by gender, and even less possible mechanisms underlying these inequities. It is urgent and important to understand these differences to build housing solutions that do not replicate oppressive gender dynamics. For this reason, the aims of this study are: 1) to synthesize the published literature on gender, housing and health, 2) to describe the differences in health outcomes according to gender, and 3) to critically analyze the incorporation of a gender perspective in the studies reviewed. A fourth objective is to review the framework on the relationship between housing and health by Novoa, incorporating a gender perspective.

## 2. Methods

### 2.1. Search strategy and study selection

Critical review methodology was used to identify and evaluate the incorporation of a gender perspective in the existing evidence on the relationship between housing and health. The purpose of this type of review is to describe and critically analyze the existing literature and generate a subsequent proposal or conceptual innovation that contributes to the field in which the research is conducted, in this case on gender, housing and health studies (Grant & Booth, 2009). We conducted a literature search in October 2020 and four bibliographic databases were used, MEDLINE, Scopus, Web of Science and Redalyc. It included papers written in English and Spanish, with no restriction on publication date, including studies published up to October 2020. The search syntax was adapted according to each databased (specific search terms described in Appendix 1), and all citations were imported into Rayyan reference management software (Elmagarmid, Hammady, Ilyas, Khabsa, & Ouzzani, 2014).

For study selection, first duplicate articles were eliminated, then studies related to other fields were excluded. After this process, the review by title and abstract, and then by full text of the articles, was carried out by pairs of independent researchers (C.B.-A.F., and A.R.-C.V.) using the following selection criteria: 1) empirical studies (quantitative, qualitative or mixed methods); 2) based on the housing conditions of the determinants of the relationship between housing and health theoretical framework (Novoa et al., 2014), studies must have included as a principal independent variable any of these housing components: a) tenure; b) affordability/cost; c) emotional bonds and roles; d) physical conditions; and e) Overcrowding/space. Those studies that addressed some housing component related to homelessness, domestic violence, institutionalized people, interventions evaluations or neighborhood without housing, were excluded because, although they are related to housing, they are other phenomena, with their own complexities. 3) These studies must have analyzed at least one health outcome (physical or mental health), health behaviors (e.g. drugs abuse) or other related issues, such as psychosocial determinants (e.g. self-concept, social support, discrimination), uses of services or treatment adherence as a dependent variable. Moreover 4) the results must have stratified by gender or sex, in the case of qualitative studies, we also included papers if they distinguish the verbatims by gender. Also, we included those studies that analyze only one gender/sex, to explore whether did so for reasons of gender or some other explicit reason, or simply because of population availability or even because of some gender bias. Finally, a third independent researcher resolved any discrepancies between reviewers.

### 2.2. Data analysis

For each selected article we extracted data regarding to namely author, publication year, country, main objective, type of design, sample characteristics, main housing component, health measures and findings by gender/sex. To assess the quality of the included studies, we used the Mixed Methods Appraisal Tool (MMAT) (Hong et al., 2018), designed to critical appraise the methodological quality of qualitative, quantitative, and mixed methods studies. This tool includes 2 screening questions to exclude nonempirical studies, and 5 specific items to assess the methodological quality of each study design (qualitative, RCT, non-randomized, descriptive quantitative, and mixed methods). Each item is scored on a categorical scale ("yes", "no" and "can't tell") and the number of items rated as "yes" is counted to obtain an overall score.

To analyze the inclusion of gender perspective, we used the validated questionnaire "Gender Perspective in Health Research" (PEGEIN) (Tomás et al., 2015) that included 10 questions to identify three dimensions in the sex-gender use: 1) Sex difference; 2) Gender sensitive; and 3) Feminist research (Table 1). These dimensions are mutually exclusive, that is, each study can pertain to only one of them. A dimension is considered affirmative if, at least, one of the items that includes is present in the study.

For the analysis, first we performed a description of the selected articles, reporting their distribution by year of publication, country, design type, gender category, age category, main housing component, health outcome, gender perspective, and study design quality. Then, we evaluated the gender perspective included in each article according to the three dimensions above mentioned. Finally, we grouped the articles by the main housing component studied and we described the main health outcomes and quality of them.

## 3. Results

### 3.1. Study selection

The search resulted in total 20,988 papers, we identified and excluded duplicate references (5,263). To exclude papers related to other fields such as veterinary medicine or molecular biology, C.V.

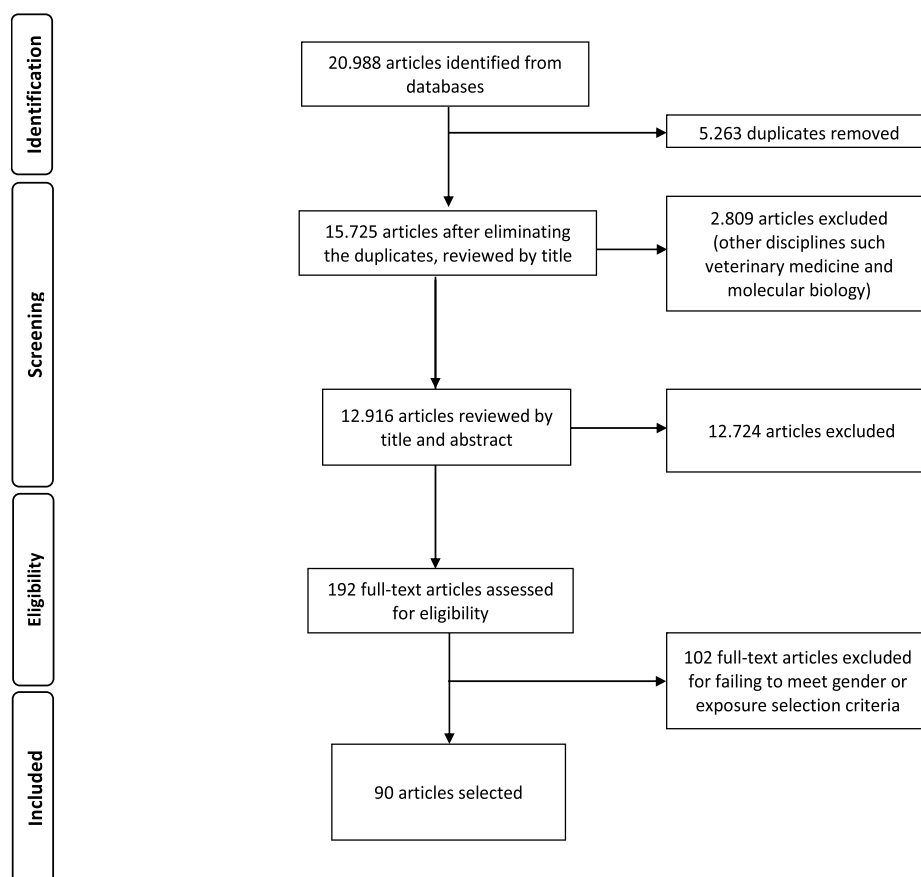
**Table 1**  
Selection criteria for each gender dimension.

Gender Dimension	Selection criteria
<b>Sex difference</b>	<ol style="list-style-type: none"> <li>1. Methodology: has the sample been stratified by sex?</li> <li>2. Methodology: has the sample been stratified by age group?</li> <li>3. Does the project help bring out the differences between men and women in the health issue studied?</li> </ol>
<b>Gender sensitive</b>	<ol style="list-style-type: none"> <li>1. Introduction: have references to existence or non-existence of scientific knowledge with gender perspective been included?</li> <li>2. Introduction: is there any reference to the magnitude of the problem in women and men?</li> <li>3. Objectives/hypotheses: does it seek the association between the health issue studied and any gender determinant?</li> <li>4. Methodology: do the variables used highlight the existing relationship between the health issue studied and any of the gender factor(s): social role, attitudes, beliefs, sex division of work, sexual identity, family role, life cycle?</li> </ol>
<b>Feminist research</b>	<ol style="list-style-type: none"> <li>1. Introduction: does it consider the gender category as a health determinant?</li> <li>2. Does the project aim at helping increase the knowledge of women and men's health and diversity in its expression?</li> <li>3. Does it aim at helping point out changes in the gender structure that may affect on equality or equity between men and women in health?</li> </ol>

reviewed unduplicated papers by title (15,725). After this process, the number of papers was reduced to 12,916 which were reviewed by title and abstract in duplicate. From the 192 articles selected for full-text review, we excluded 102 because they did not meet the inclusion criteria for stratification by sex/gender or because they did not meet the criteria for the primary exposure variable (Fig. 1).

### 3.2. Study characteristics and quality

We selected 90 articles, of which the majority were published in the last 10 years (68%) and from North American and European countries (63%) (Table 2). In terms of study design, most studies were cross-sectional (53%), or cohort (27%) (Table 2). Also, most of the studies analyzed outcomes in women and men (62%) or women exclusively (30%), and only 3% in transgender or non-binary gender. In addition, only a few studies focusing on childhood (13%) or older adults (8%). In relation to the housing component, the majority of studies focused on affordability/cost or physical conditions (36% and 32%, respectively) (Table 2). Regarding health outcomes, 61% of the selected studies considered mental health (anxiety, stress, depressive symptoms, psychological impairments, happiness, subjective well-being, poor mental health or psychological distress, and suicide), 53% assessed physical or general health (self-rated health, non-communicable diseases, respiratory symptoms, uterine disorders, sleep quality, morbidity, cancer, asthma, hypertension, birth outcomes, cardiovascular disease, mortality), 12% assessed health behaviors (smoking, alcohol misuse, HIV risk behavior, physical exercise), and 8% used other measures of health (aggressiveness, criminal behaviors, sexual satisfaction, early health-related retirement, treatment adherence, access to health care) (Table 2). Related to gender perspective, only 20% of the studies were in the research feminist category, 31% were in the gender sensitive category, 33% in the sex difference category, and 16% were not classified in any category because they did not meet the minimum requirements for any of them (no gender perspective); however, these articles were still included because they analyzed a single gender and, therefore, met the inclusion criteria of the review (Table 2). Finally, in terms of quality, 76% of the studies obtained 4 or 5 items positive, 14% obtained 3 items positive, and 10% obtained one or two items positive. The descriptive



**Fig. 1.** Flow chart of information through the different phases of critical review.

**Table 2**  
Descriptive of studies selected.

	N°	%
Year of Publication	(N = 90)	
Before 1990	3	3,3
1990–1999	10	11,1
2000–2009	16	17,8
2010–2020	61	67,8
<b>Country</b>		
UK	10	11,1
Germany	3	3,3
Sweden	5	5,6
Spain	7	7,8
USA	23	25,5
Canada	8	8,9
Australia	4	4,4
China	6	6,7
Others	24	26,7
<b>Study design</b>		
Cohort	24	26,7
Cross-sectional	48	53,3
Qualitative	12	13,3
Others	6	6,7
<b>Gender Category</b>		
Women	27	30,0
Men	4	4,5
Women and Men	56	62,2
Transgender or non-binary gender	3	3,3
<b>Age Category<sup>a</sup></b>		
Childhood or adolescence	13	14,4
Adult	76	84,4
Older adult	7	7,8
<b>Main housing component</b>		
Tenure	9	10,0
Affordability/cost	32	35,6
Emotional bond/roles	11	12,2
Physical conditions	29	32,2
Overcrowding/space	9	10,0
<b>Health Outcome<sup>a</sup></b>		
Mental health	55	61,1
Physical health	48	53,3
Health behaviors	11	12,2
Others	7	7,8
<b>Gender Analysis</b>		
No gender perspective	14	15,6
Sex difference	31	34,4
Gender sensitive	27	30,0
Feminist Research	18	20,0
<b>Study design Quality</b>		
1 item	3	3,3
2 items	6	6,7
3 items	13	14,5
4 items	39	43,3
5 items	29	32,2

<sup>a</sup> Categories are not mutually exclusive; totals do not apply.

table with all the articles included can be reviewed in the appendices (Appendix 2).

### 3.3. Gender perspective inclusion

In general, the studies reviewed do not present a strong gender perspective. Most of them only differentiate by sex in their analyses (N = 31), which is observed in the stratification they perform. The studies that were found to have a gender-sensitive perspective are fewer than the previous ones (N = 27), however, they have some discussion of gender issues either in their introduction and/or in the discussion of the articles. Finally, as we have mentioned, a minimal part of the studies present a feminist perspective in their research (N = 18), and only 5 studies meet all the criteria of this dimension, that is, they consider the category of gender as a determinant of health, aim to help increase knowledge of the health of women and men and the diversity in its expression, and aim to help point out changes in the gender structure

that may affect equality or equity between men and women in health. Regarding to gender perspective inclusion criteria, of the 18 studies included in feminist research, only 28% (N = 5) met all three criteria of the category, 50% (N = 9) met only 2 criteria, and 22% (N = 4) met the minimum of one criterion. In the case of gender sensitive (N = 27), only 4% (N = 1) of studies met all 4 criteria, 33% (N = 9) met 3 criteria, and most studies met only one criterion (45%). In the 31 sex difference studies, none met all 3 criteria, and most studies met only one criterion (61%) (Table 3). There are 14 studies that do not meet any of the criteria of the gender perspective questionnaire, therefore they have been classified as not having a gender perspective. All these articles have studied a single sex/gender without justifying the gender selection of the sample, or have analyzed only women with children, without differentiating between the sex/gender of the children (Table 3).

On the other hand, in studies focusing on housing physical conditions, the predominant gender perspective was sex difference or no gender perspective (66%). In contrast, 55% of the studies focused on emotional bonds/roles were included in the feminist research category. In turn, studies focused on childhood/adolescence and the elderly, the predominant gender perspective was sex difference or no gender perspective (75% and 57%, respectively). Related to health outcomes, those studies that analyzed mental health were mostly included in the gender-sensitive category (38%); in contrast, most studies that analyzed physical health were categorized as sex difference (48%) (Table 4).

### 4. Overall results by gender

Although we observed negative health effects associated with housing problems in all genders, women and trans or non-binary population showed worse results, compared with men (Table 5). These results also varied within each gender, according to age, race/ethnicity, social class, sexual orientation, etc. (see appendix 2)

For women, housing problems and adverse housing situations were associated with worse mental health outcomes, such as increased anxiety, generalized anxiety disorder, stress, depression, major depression, emotional distress, sleep disorders, impairment in daily tasks, and suicide due to lack of social support. In addition, a higher use of health services was observed in affected women, as well as a increased medication and tobacco use. In terms of physical health, it was associated with a higher probability of hypertension, worse recovery from breast cancer, poorer self-perceived health, higher prevalence of chronic diseases, higher probability of respiratory diseases and associated symptoms, worse birth outcomes, higher ITS symptoms, fatigue, psychosomatic symptoms, skin problems, and muscle pain. Finally, it was also associated with a higher prevalence of sexual violence and physical violence.

For men, the effects were associated with worse mental health outcomes, such as impairment in daily tasks, depression, stress, emotional distress, sleep disorders, increased risk of suicidal thoughts in boys, feelings of loss of control, and increased suicide rate. It was also associated with higher tobacco and alcohol use, less physical activity, and unmet health needs (physical and mental). In terms of physical health, it was associated with poorer self-perceived health, higher probability of

**Table 3**  
Number of inclusion criteria in each Gender dimension.

Inclusion criteria	No gender perspective		Sex Difference		Gender Sensitive		Feminist Research	
	N°	%	N°	%	N°	%	N°	%
None	14	100	na	na	na	na	na	na
One criterion	Na	na	19	61,3	12	44,5	4	22,2
Two criteria	Na	na	12	38,7	5	18,5	9	50,0
Three criteria	Na	na	0	0	9	33,3	5	27,8
Four criteria	Na	na	Na	na	1	3,7	na	na
Total	14	100	31	100	27	100	18	100

**Table 4**  
Gender Perspective inclusion according to housing variables, age category and health outcomes.

	No Gender Perspective		Sex Difference		Gender Sensitive		Feminist Research		Total	
	N°	%	N°	%	N°	%	N°	%	N°	%
<b>Main housing Component</b>										
Tenure	0	0	3	33,3	4	44,5	2	22,2	9	100
Affordability/cost	3	9,4	13	40,6	9	28,1	7	21,9	31	100
Emotional bonds/roles	0	0	4	36,4	1	9,1	6	54,5	11	100
Physical conditions	9	31,0	10	34,5	9	31,0	1	3,5	29	100
Overcrowding/space	2	22,2	1	11,1	4	44,5	2	22,2	10	100
<b>Age Category<sup>a</sup></b>										
Childhood or Adolescence	4	33,3	5	41,7	3	25,0	0	0	12	100
Adult	14	18,4	21	27,6	25	32,9	16	21,1	76	100
Elderly	0	0	4	57,1	1	14,3	2	28,6	7	100
<b>Health Outcome<sup>a</sup></b>										
Mental health	6	10,9	14	25,5	21	38,1	14	25,5	55	100
Physical Health	9	18,8	23	47,9	10	20,8	6	12,5	48	100
Health Behaviors	1	9,1	5	45,5	2	18,2	3	27,2	11	100
Others	0	0,0	4	57,1	1	14,3	2	28,6	7	100

<sup>a</sup> Categories are not mutually exclusive; totals do not apply.

hypertension and obesity, higher probability of asthma (especially in children), eye symptoms, and premature mortality.

Finally, non-binary or trans people were additionally affected by stigma, discrimination, higher risk of physical and sexual violence, increased substance use, lower adherence to treatment, feeling of being trapped and loss of control, lack of social support, and higher probability of being harassed in the neighborhood context.

#### 4.1. Results by main housing component

##### 4.1.1. Tenure

In this dimension, there is no clear trend in health outcomes and neither by gender. The results are diverse, in some cases contradictory, both between and within genders as can be seen in Table 5 that summarizes gender differences in health according to main exposures observed in studies. In terms of gender perspective, from the 9 studies in this category, only 2 studies are Feminist Research, 4 studies are Gender Sensitive, and other 3 studies are Sex Difference.

Thus, the 2 studies considered as a Feminist Research (Kim & Mak, 2015; Wasylshyn & Johnson, 1998), analyzing the greater stress in women who cohabit with their parents, as opposed to men who showed greater stress when they did not cohabit with their parents (Kim & Mak, 2015), and how cooperative housing reduces loneliness but increases perceived stress for low-income women (Wasylshyn & Johnson, 1998).

Other 4 studies were categorized as Gender Sensitive and analyzed contrary effects associated with the tenure shift from owning to renting -mental health worsens in men, improves in women- (André, Dewilde, & Muffels, 2019), greater physical and mental impairments in renters, but with differences by age according to women and men (Forbes, Hayward, & Agwani, 1991), higher tobacco use in male and female renters, but with effects of 10 times more in unmarried female renters (Lim, Chung, Kim, & Lee, 2010), and the sexual satisfaction associated with property in women (Do, Khuat, & Nguyen, 2017).

The remaining 3 studies were categorized as Sex Difference, and presented dissimilar results between genders, but did not discuss them (Atalay, Edwards, & Liu, 2017; Hartig & Fransson, 2006; Laaksonen, Tarkiainen, & Martikainen, 2009). These differences refer to better self-perceived health and lower mortality associated with ownership, mainly in men (Atalay et al., 2017; Laaksonen et al., 2009), a lower probability of early retirement for health reasons in men who live in cooperatives, and in women who live in cooperatives or who are homeowners (Hartig & Fransson, 2006).

In terms of quality, all the studies in this dimension obtained a high results, 6 of them with all positive items, and 3 of them with 4 out of 5 items.

##### 4.1.2. Affordability/cost

Problems in this housing dimension negatively affect all genders, but most severely women, and, in the case of housing insecurity, non-binary or transgender people (Table 5). Thus, among the 32 studies in this category, 7 were included as Feminist Research, 9 as Gender Sensitive, 13 were included as Sex Difference, and 3 as No Gender Perspective.

From the Feminist Research studies, 3 studied non-binary (Glick et al., 2019; Wilkinson & Ortega-alcázar, 2019) or transgender (Fletcher et al., 2015) populations, making an intersectional analysis, and of the increase in sexual vulnerability and insecurity, overall in marginalized groups (sexual dissidents and racialized people). 4 others studies in this category analyzed life experiences of HIV parents (Greene et al., 2010), housing instability and hypertension (Vijayaraghavan et al., 2012), suicide rates by sex and race/ethnic associated with foreclosure (Houle et al., 2017), and health outcomes due to inequalities in exposure in HIV-positive African American women (Delavega & Lennon-dearing, 2015).

In the Gender Sensitive category, one study found no association between the housing crisis and suicide rates for women and men (Jones & Pridmore, 2016), another observed worse health outcomes in people with housing problems, especially in women (Novoa et al., 2015), and 2 others found inconsistent results regarding the long-term effects of housing insecurity and affordability on mental health (Taylor et al., 2007; Bentley et al., 1136). Finally, the remaining 5 studies in this category focused on specific profiles of women with housing insecurity: indigenous women with children (Daoud & Jabareen, 2014), mothers with and without intimate partner violence (Suglia et al., 2011), farm women (Richardson et al., 2014), sex workers (Reed et al., 2011), and postpartum African-American women (Osypuk et al., 2012).

In the Sex Difference category, although none study mentioned gender differences in their discussions, certain differences were observed in the results. Of them, 5 observed worse physical (Bolívar Muñoz et al., 2016) and mental health outcomes (Hamoudi & Dowd, 2014; Hiilamo & Grundy, 2018; Nettleton & Burrows, 1998; Smith et al., 2017) in affected women; conversely, 3 studies observed slightly worse mental (Kerr et al., 2018; Rodgers et al., 2019; Vásquez-Vera et al., 2016) and physical health outcomes (Rodgers et al., 2019) in men. Two other studies found differential effects according to the characteristics of the exposure (women more affected by lack of social support, and men by bank pressure) (Mateo-rodríguez et al., 2019) and the type of health consequences (women presenting more chronic diseases and men more alcohol consumption) (Bernal-solano et al., 1606). Finally, 3 qualitative studies did not directly explore possible gender differences in health outcomes (Andersen et al., 2016; Hernández, 2016; Vásquez-Vera et al., 2019).

The 3 remaining studies were based only on women and were

**Table 5**  
Gender differences in health outcomes according to main exposures by housing dimension.

Main exposures observed by housing dimension	Definition of main exposure	Women			Men			Non-Binary/transgender			Differences by gender
		M. H	P-H	H-B	M. H	P-H	H-B	M. H	P-H	H-B	
<b>Tenure (N = 9)</b>											
Renting	People who rent a dwelling (Atalay et al., 2017; Forbes et al., 1991; Laaksonen et al., 2009; Lim et al., 2010)	+	+	+	+	+	+				No clear trends are observed
Ownership	People who own a dwelling (Atalay et al., 2017; Do et al., 2017; Hartig & Fransson, 2006)	+	+		+	+					
Co-housing	People who live in cooperatives housing (Hartig & Fransson, 2006; Wasylshyn & Johnson, 1998)	+		+	+		+				
Shift tenure	Shift from owning to renting (André et al., 2019)	+			+						
Living with parents	Adults who live with parents (Kim & Mak, 2015)	+			+						
<b>Affordability/Cost (N = 32)</b>											
Insecurity	Threat of eviction, unsecure tenure and doubling-up (Andersen, Williamson, Fernando, Redman, & Vincent, 2016; Daoud & Jabareen, 2014; Fletcher, Kisler, & Reback, 2015; Glick, Lopez, Pollock, & Theall, 2019; Grjibovski, Olov Bygren, Svartbo, & Magnus, 2004; Jones & Pridemore, 2016; Nettleton & Burrows, 1998; Novoa et al., 2015; Taylor, Pevalin, & Todd, 2007; Vázquez-Vera et al., 2019; Wilkinson & Ortega-alcázar, 2019)	+	+	+	+	+	+	+	+	+	Negative effects are observed in all genders. Greater effects are observed in women, and, in insecurity, in non-binary or transgender people
Foreclosure	Legal process of foreclosure or eviction (Bernal-solano, Bol, & Mateo-rodr, ; Kerr et al., 2018; Vázquez-Vera, Rodríguez-Sanz, Palència, & Borrell, 2016; Bolívar Muñoz et al., 2016; Mateo-rodríguez et al., 2019; Osypuk, Caldwell, & Platt, 2012; Houle, Light, States, & States, 2017; Schootman, Deshpande, Pruitt, & Jeffe, 2012; Richardson, Nash, Tan, & Macdonald, 2014)	+	+	+	+	+	+	+	+		
Affordability	Live in a secure place with enough financial resources for other life necessities (Rodgers et al., 2019; Bentley, Baker, & Mason, ; Hernández, 2016)	+	+		+	+					
Instability	Moving frequently due to an inability to pay dwelling (Carrion et al., 2014; Delavega & Lennon-dearing, 2015; Greene et al., 2010; Reed, Gupta, Biradavolu, Devireddy, & Blankenship, 2011; Smith, Hawke, Chaim, & Henderson, 2017; Suglia, Duarte, & Sandel, 2011; Vijayaraghavan, Kushel, Vittinghoff, & Kertesz, 2012)	+	+	+	+	+	+	+	+	+	
Debt	Household housing and financial debt (Hiilamo & Grundy, 2018)	+			+						
<b>Emotional bound/roles (N = 11)</b>											
Unequal housework	Unequal distribution of housework between genders (Bird, 1999; Eek & Axmon, 2015; Khawaja & Habib, 2007; Sánchez-Herrero Arbide, Sánchez-lópez, & Dresch, 2009)	+	+	+	+	+					Clear trend. Women are negatively affected, while men are not
Family roles/composition	Family typology and roles within the household (Arber, 1991; Pritchard & Teo, 1994)	+									
Housing satisfaction	Sense of home or housing satisfaction (Fänge & Ivanoff, 2009; Fleming, Collins, Fowler, & Boyd, 2020; Knöchelmann, Seifert, Günther, Moor, & Richter, 2020; Kylén, Löfqvist, Haak, & Iwarsson, 2019; Lai & Guo, 2011)	+	+	+	+	+	+	+	+	+	
<b>Physical conditions (N = 29)</b>											
Indoor pollution	Dwelling with indoor pollution (Choi et al., 2015; Guo, Yokoyama, Piao, & Sakai, 2013; Liu, Sacco, Riboli, & Xuan Hu, 1993; Mengersen et al., 2010, 2011; Norbäck et al., 2019; Tamire, Addissie, Kumie, & Husmark, ; Norboo, Yahya, & Ball, 1991)	+	+		+	+					Negative effects in women and men, but women's mental health is more severely affected
Dampness	Presence of dampness, mold or pests in the dwelling (Behrens et al., 2005; Dong, Ding, Ma, Jin, & Cao, 2008; Harville & Rabito, 2018; Pevalin, Taylor, & Todd, 2008, pp. 37–41; Tsai et al., 2006; Ukawa, Araki, & Kanazawa, 2012; Zahner, Kasl, White, & Will, 1985)	+	+		+	+					
Outdoor pollution	Outdoor pollution and noise that affects dwelling (Aretz, Doblhammer, & Janssen, 2019; Jensen, Rasmussen, & Ekholm, 2019)	+	+				+				
Material deficiencies	Physical deficiencies or lack of basic services (Burdette, Hill, & Hale, 2011; Chakraborty, Bose, & Bisai, 2009; Duvall & Booth, 1978; Elliott, Leventhal, Shuey, Doyle Lynch, & Levine Coley, 2016; Evans, Wells, Chan, & Saltzman, 2000; Fang, Chen, Guo, & Ma, 2019; Harrington et al., 2005; Jocson & Mcloyd, 2015; Mcnamara, Balaj,	+	+		+	+					

(continued on next page)

**Table 5** (continued)

Main exposures observed by housing dimension	Definition of main exposure	Differences by gender						
		Women		Men		Non-Binary/transgender		
		M.	P-H	H-B	M.	P-H	H-B	
<b>Space/Overcrowding (N = 9)</b>	Thomson, Eikemo, & Bambra, 2017; Paterson, Lusitimi, Tautolo, Taylor, & Clougherty, 2018, pp. 140–144; Saito, Iwata, Hosokawa, & Ohi, 1993; Sandberg et al., 2014)							
Overcrowding	People per room ratio (Fuller, Edwards, Sermisi, & Vorakitchokatorn, 1993; Gabe & Williams, 1987; Mangrio & Zdravkovic, 2018; Mora, Quandt, Chen, & Arcury, 2016; Pepin et al., 2018; Riva et al., 2014a, 2014b; Wells & Harris, 2007)	++	+	++	+	+	+	Overcrowding has a greater effect on women's health. Housing size only affects men's mental health
Housing size	Size of dwelling associated with wellness (Foye, 2017)	-						

M:H: Mental Health; P-H: Physical Health; H-B: Health Behaviors.

+: positive effect.

++: negative effect; ++: worse effect.

-: no effect.

categorized as No Gender Perspective because they did not explain why they studied only one gender neither did they meet any inclusion criteria in the other gender perspective categories (Carrion et al., 2014; Grjibovski et al., 2004; Schootman et al., 2012).

Regarding the quality of the studies in this dimension, 13 studies obtained all 5 points, 16 obtained 4 points, and 3 studies obtained 3 points.

4.1.3. Emotional bonds/roles

In this dimension there is a clear trend in gender differences, only women's health is negatively affected by household roles and housework (Table 5). Thus, among 11 studies in this category, 6 were categorized as Feminist Research, only 1 as Gender Sensitive, and 4 as Sex Difference.

Among Feminist Research studies, 3 discussed the unequal distribution of housework and its greater negative impact on the physical and mental health of women (Bird, 1999; Eek & Axmon, 2015; Khawaja & Habib, 2007), and one reported an improvement in the self-perceived health and satisfaction of men who reported that their partners were in charge of housework, but without negative results associated with their own hours of housework (Sánchez-Herrero Arbide et al., 2009). The other 2 studies analyzed unequal health outcomes, associate them to inequalities in roles within the household (Arber, 1991), and to structural gender differences, with women being more disadvantaged (educational level, living arrangement, social support and satisfaction) (Lai & Guo, 2011).

Only one study was included in the Gender Sensitive category, which associated the housing strain in women with preterm birth and low birthweight (Pritchard & Teo, 1994).

The remaining 4 studies were included in the Sex difference category. One of them did not observe gender differences in the relationship between housing satisfaction and self-perceived health (Knöchelmann et al., 2020); while the other three (qualitative) studies analyzed populations of older people (Fänge & Ivanoff, 2009; Kylén et al., 2019) and people with HIV who used drugs (Fleming et al., 2020), without exploring gender differences in perceptions.

Finally, in relation to quality, most studies (7) obtained 4 points, followed by those that obtained 5 points (3), and only 1 obtained 3 points.

4.1.4. Physical conditions

Among the studies analyzed in this dimension, poor physical housing conditions negatively affect the health of both women and men, but with worse results for women's mental health (Table 5). In addition, from the 29 studies in this category, only 1 was a Feminist Research, 9 were classified as Gender Sensitive, 10 as Sex Difference, and 9 as No Gender Perspective.

The study included in the Feminist Research category analyzed gender differences in geriatric depressive symptoms associated with housing environment (Fang et al., 2019).

Then, 9 studies were classified as Gender Sensitive, of which 4 focused in housing conditions, associated with negative effects on women's physical (Duvall & Booth, 1978) and mental health (Duvall & Booth, 1978; Paterson et al., 2018), and with worse physical (Pevalin et al., 2008) and mental health (Elliott et al., 2016) outcomes for women compared to men. Another 3 studies analyzed pollution, observing worse health outcomes in rural women compared with urban ones, (Tamire et al., ) and inequalities in exposure to indoor pollution (Norboo et al., 1991), outdoor noise annoyance (Jensen et al., 2019), that would explain the worse physical and mental health outcomes for women compared to men. The remaining 2 studies of this category addressed housing conditions in women with children (Saito et al., 1993), and between girls and boys (Jocson & Mclloyd, 2015).

Sex Difference category included 10 studies, of which 3 analyzed the association between indoor pollution and respiratory problems in adults, with detrimental results especially in women (Guo et al., 2013;

Liu et al., 1993; Norbäck et al., 2019); one of them analyzed outdoor pollution with worse results in men (Aretz et al., 2019), and 4 of them measured indoor pollution and dampness conditions in children, finding in general a greater association with asthma in boys (Dong et al., 2008; Tsai et al., 2006; Ukawa et al., 2012), except one in which it was greater in girls (Behrens et al., 2005). The remaining 2 studies of this category addressed poor material conditions of the dwelling associated with physical health (Mcnamara et al., 2017), and the relationship between health and fuel poverty (Harrington et al., 2005).

Finally, 9 studies were included as No Gender Perspective, focused only on women (Burdette et al., 2011; Choi et al., 2015; Evans et al., 2000; Harville & Rabito, 2018; Mengersen et al., 2010, 2011; Zahner et al., 1985) or men (Chakraborty et al., 2009; Sandberg et al., 2014), and without discussing gender inequalities or explaining why they analyzed only one gender.

Associated with the quality of the studies in this dimension, most studies obtained between 3 and 5 points (7 studies in each score), 5 studies obtained 2 points, and 2 studies only obtained 1 point.

#### 4.1.5. Space/overcrowding

Overcrowding affects the health of both women and men, but with greater effects on women's health; in contrast, housing size only positively affects men's mental health (Table 5). From the 9 studies in this dimension, 2 studies were classified as Feminist Research, 4 as Gender Sensitive, only 1 as Sex Difference, and 2 as No Gender Perspective.

The Feminist Research studies reported greater detrimental effects of crowding in women compared with men (Gabe & Williams, 1987; Riva et al., 2014b).

In the Gender Sensitive dimension, were included 4 studies, observing worse effects of crowding in women compared with men (Riva et al., 2014a), no differences of crowding effects in adolescents (Pepin et al., 2018), neither in migrants (Mangrio & Zdravkovic, 2018), and an association between larger household size and well-being only in men (Foye, 2017).

Only one study was included in Sex Difference category, which reported worse physical health outcomes in women associated with overcrowding (Fuller et al., 1993).

And the remaining 2 studies, only based on one gender, were in the No Gender Perspective category because they did not explain why they studied only one gender nor did they meet any inclusion criteria in the other gender perspective categories (Mora et al., 2016; Wells & Harris, 2007).

In terms of the quality of the studies in this dimension, no study obtained 5 points, 6 of them obtained 4 points, 2 studies obtained 3 points, and one study obtained 2 points.

#### 4.2. Conceptual framework

Considering all the above results, we have proposed a conceptual framework that addresses the relationship between housing and health from an intersectional gender perspective. In this sense, based on the conceptual framework of Novoa et al. (Novoa et al., 2014), we have proposed an adapted version that takes this relationship into account based on this review (Fig. 2).

Thus, the framework will consider, firstly, the systems of oppression that permeate life in current societies, namely patriarchy, understood as a form of political, economic and religious social organization, centered on the authority of men and their domination over women (Walby, 1993); colonialism, based on social classification and hierarchization by racial/ethnic reasons that constructs subaltern geo-cultural identities (Lugones, 2008); and capitalism, as a system of production and valorization of social, economic and political relations with merchandizers effects of private profit (Delanty, 2019). Secondly, as structural determinants that determine access to adequate housing, there are 3 dimensions: macroeconomic and social policies, which include the welfare state, economic policies, labor market policies, environmental policies,

and migration policies; the housing system, comprising housing market and housing policies; and culture and value systems, such as gender binarism and cis-heterosexual privilege, the social value of private property, and notions of citizenship and migration. These elements are interrelated with the different axes of inequity, generating a social stratification that transversally affects the entire relationship between housing and health processes, and also implies a context of stigmatization, discrimination and violence against disadvantaged groups. Thirdly, at an intermediate level are housing, divided into non-material conditions such as legal/tenure, economic/affordability, and emotional bound and roles, and material conditions such as physical conditions, distribution and space, energy, and noise; and the neighborhood divided into material conditions and the community. Housing and neighborhood are reciprocally related to each other, mediated also by everyday living conditions (Beebejaun, 2017; Elias & Rai, 2019), understood as uses of time-space, household and families typologies, care work and sexual division of labor, and vital needs according to people's age. Finally, the intersections of all the aforementioned dimensions generate an impact on people's health, which in turn influences access to and maintenance of adequate housing (Fig. 2).

#### 5. Discussion

This review provides an overview of the current evidence that analyzes the relationship between housing and health, using a gender perspective. Despite having identified a great amount of evidence on this relationship, after selection according to the basic criteria of gender perspective, only a minimal part of them was included (from 12,916 articles reviewed by title and abstract, only 90 were selected for this review). This reflects the minimal number of literature that includes aspects of gender perspective in their analyses. Likewise, of the selected studies, only a minority conducted feminist research that problematizes gender structure and relations, followed by gender-sensitive studies that understand gender as a determinant of health, and by other research that only met the minimum criteria for sex/gender differences. It is remarkable the proportion of studies that, despite meeting the selection criteria, do not include any gender perspective in their analysis, which could be assuming gender differences in an exploitative way, in other words, maintaining or reproducing these structures of inequality (Muralidharan et al., 2015).

Almost all the studies analyzed make a binary distinction of gender, only 3 studies consider a broader view and investigated other profiles of people. This is congruent with the current mainstream view of gender studies and policies, which focuses mainly on inequalities between women and men, with an emphasis on women (Connell, 2012; Han-kivsky, 2012; JHPIEGO, 2016). Gender binarism risks replicating power relations and hide oppressions related to other sexual and gender diversities (Doan, 2010; Nowatzki & Grant, 2011; Pujal & Amigot, 2010). It is important to be able to broaden the focus beyond gender binarism in future studies.

Regarding age, very few studies analyze vulnerable age groups such as children or the elderly, and the ones that analyze them do not include a gender perspective, as shown in Table 4. The underrepresentation of these age groups may contribute to invisible health inequities, since middle-aged groups are considered as the only subject of research (Ayalon et al., 2018). Accordingly, researchers have defined the concept of gendered ageism to show the multiple power relations that exist between both axes of inequity and how these affect people differently (Krekula, Nikander, & Wilińska, 2018). Regarding other intersections, although most studies considered other factors that shape people besides gender (class, race, age, sexual identity and orientation, territory, among others), they did not perform an intersectional analysis of these elements, except for those qualitative studies focused on non-binary or trans population. Studies have shown that an additive analysis can mask health inequalities generated from the complex intersection and power relations of the aforementioned factors (Hammarström et al., 2014;



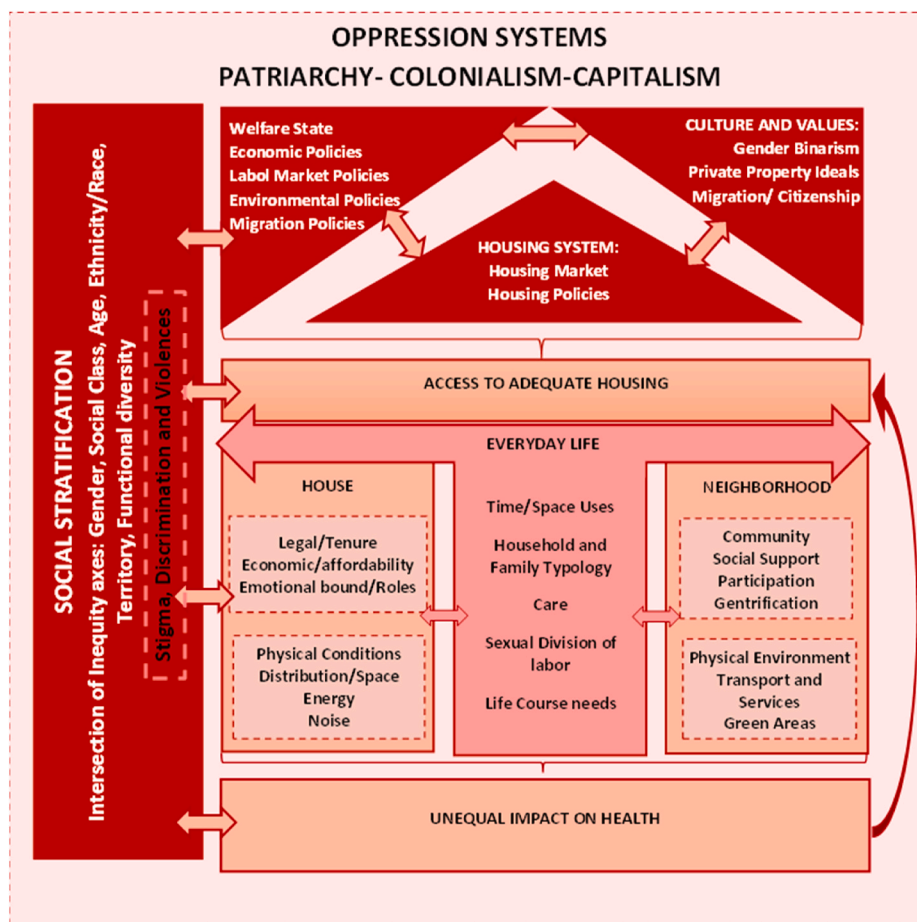


Fig. 2. Conceptual Framework of the Relationship among gender, housing and health. Adapted from [Novoa et al., 2014](#).

[Hankivsky, 2012](#)). Conversely, the intersectional perspective has been proposed as a useful element in health research, since it allows addressing the different dimensions and levels of oppression or privilege that compose the social phenomena associated with people's health ([Bauer, 2014](#)).

Regarding health outcomes by gender, trends varied according to the housing dimension analyzed, as shown in [Table 5](#). The dimensions with less clear or even contradictory trends were tenure and physical housing conditions; in contrast, those with more evident trends were emotional bound/roles and affordability/cost. This may be due, on the one hand, to the wide variety of exposures analyzed regarding tenure ([Corbetta, 2007](#)), in addition to differences in countries' policies and cultures related to tenure and private property, which may contribute to different results among the studies analyzed. On the other hand, it is also related to less exploration of gender differences in the health outcomes regarding tenure, which may mask different gender outcomes ([Lin, L'Orange, & Silburn, 2007](#)).

Despite differences in trends, overall, in almost all studies analyzed, worse outcomes were observed in both women and transgender or non-binary when compared to men. These differences can be explained by different mechanisms. One of them, associated with oppressive systems operating in current societies such heteropatriarchal, colonial or capitalism system, it refers to structural differences that systematically make these groups more vulnerable, leading to greater susceptibility to more precarious living conditions ([Fletcher et al., 2015](#); [Glick et al., 2019](#); [Lai & Guo, 2011](#); [Vijayaraghavan et al., 2012](#)). For example, as noted in [Glick et al.](#), trans or gender non-conforming groups are affected by intersectional stigma (racism, misogyny, capitalism and transphobia) leading to greater physical and sexual vulnerability, employment difficulties and, moreover, greater housing insecurity ([Glick et al., 2019](#)).

This also has a strong effect on women, who are more exposed to situations of violence, as shown by [Reed et al.](#) ([Reed et al., 2011](#)), or as observed in [Lai et al.](#), older women's lower housing satisfaction was associated with worse living conditions such as less education, reduced social support, higher poverty and less social security coverage in general ([Lai & Guo, 2011](#)).

In addition, other mechanism refers to the conditions of the housing system. This, tend to discriminate against disadvantaged groups, both because of the dynamics of the housing market and the lack of policies to regulate these inequities ([Greene et al., 2010](#); [Wilkinson & Ortega-alcázar, 2019](#)). As highlighted by [Wilkinson et al.](#) on housing insecurity, the shortage of affordable housing, coupled with the lack of housing welfare and poorly regulated rental contracts, leaves people trapped in detrimental housing conditions and discriminatory environments (racist, sexist and homophobic) that impact on the safety and well-being of these groups ([Wilkinson & Ortega-alcázar, 2019](#)). Another mechanism, related to intermediate determinants, is the strong difference in gender roles that could affect the relationship with housing ([Arber, 1991](#); [Gabe & Williams, 1987](#); [Khawaja & Habib, 2007](#); [Sánchez-Herrero Arbide et al., 2009](#)). For example, in the unequal distribution of care work in detriment of women who experience a double, even triple burden of work ([Bird, 1999](#); [Kim & Mak, 2015](#)), or the role of breadwinner that to date is still more associated with the male figure ([Houle et al., 2017](#); [Novoa et al., 2014](#)). These mechanisms, both those associated with structural characteristics and those more intermediate, could also involve the unequal use and distribution of space and time associated with housing. As [Riva et al.](#) observed regarding overcrowding and how differences in gender roles and norms could explain the poorer physical and mental health outcomes of women compared to men ([Riva et al., 2014a, 2014b](#)), or as [Eek et al.](#) reported related to unequal

housework and the negative impact on women's physical, mental and relational health (Eek & Axmon, 2015). One more mechanism could be related to the different meanings of housing that are constructed according to gender norms and living conditions, which could have an impact on the sense of belonging, ontological security, and other ways of being linked to housing (Gabe & Williams, 1987; Wasylyshyn & Johnson, 1998; Wilkinson & Ortega-alcázar, 2019). In any case, more research is needed to explore in more depth the mechanisms that influence these differences.

The inclusion of the gender perspective in the studies analyzed varies according to housing dimensions: while studies addressing emotional bounds/roles include a greater gender perspective, those based on material conditions in general do not. This could be related to static views of both the housing and health relationship and the gender and health relationship; in other words, to the tendency, on the one hand, to associate mostly material housing conditions to physical health and psychosocial housing conditions to mental health (Shaw, 2004); and, on the other hand, to associate gender differences mostly to mental health (Anthias, 2001). However, both social epidemiology and feminist urbanism have criticized this cartesian dichotomy, proposing a more complex relationship between social phenomena (including gender) and health (Beebejaun, 2017; Elias & Rai, 2019; Krieger, 2001). For example, from the ecosocial theory that proposes complex and multi-level relationships between social reality and the processes of health, illness and well-being (Krieger, 1994); or, particularly for housing, in studies that have associated poor material conditions with mental health problems, as well as the relationship with psychosocial stressors that impact on people's physical health (Riva et al., 2014a; Shaw, 2004). In the case of feminist urbanism, this complexity becomes evident when positing the relationships between social phenomena (including gender), material aspects and health, as gears of the social fabric that can foster healthy, just, diverse and sustainable ways of inhabiting territories (Punt6, 2019).

Overall, the inclusion of the gender perspective in the studies was very poor, which is related to the lack of gender-sensitive indicators used in the research, which, as we have mentioned, can mask gender inequalities in the results of these studies. This may be due to the lack of conceptual frameworks with a gender perspective to guide the methodological work of the research, considering the mechanisms -direct or indirect-through which gender could be operating in the relationship between housing and health. For this reason, we believe that the conceptual framework proposal we have made can be very useful in guiding future research in housing studies.

### 5.1. Limitations and strengths of the study

The main limitation of this study was the lack of instruments to measure in depth the inclusion of a gender perspective in scientific health research. The PEGEIN questionnaire serves as a first screening to assess the presence (or not) of gender perspective in research, however, due to its way of classification, it may over represent studies included in the greater gender perspective inclusion categories. Specific questionnaires are needed that can analyze in depth the degree of gender perspective inclusion and the consistency of this throughout the research. Another limitation was not being able to analyze each housing dimension in greater depth; however, by including evidence from all housing dimensions, this study serves to evidence the overall picture of the gender inclusion in current housing and health research. Finally, other limitations are those related to the specific search for literature that may have been interesting for the review, but for reasons of space and feasibility of the review could not be included, such as other denominations of energy poverty, the specific time distribution of the household, aspects of the neighborhood and urban context, other psychosocial determinants outcomes such as stigma or identity, among others; however, these are aspects that can be further explored in other future studies more specific to some element of the relationship between

housing, gender and health. Despite these limitations, a strength of the study is that it has gathered, systematized, measured the quality, updated, and critically evaluated the scientific evidence that considers gender relations in the health effects of this social problem. This contributes to broaden the understanding of the complex phenomenon of housing and its relationship with health. In addition, the study proposes a conceptual framework with an intersectional view that serves as a guide to facilitate the inclusion of gender in future research that addresses health inequalities associated with housing, not only at the level of the house, but also considering the continuum between housing, neighborhood, and society.

## 6. Conclusions and recommendations

There is an urgent need to address gender relations in housing and health studies. To date, very few studies consider this perspective and there are no theoretical frameworks that allow us to think about this relationship beyond the traditional view. The visibility and understanding of these phenomena from academia can contribute with evidence to the debate and social policies to avoid replicating the oppressive gender dynamics that lead to inequities in population health. It is necessary to have a dynamic understanding of the diversity of social factors that operate in this relationship, considering both the particular contexts according to the conditions of the subjects, as well as the structures that enable (or constrain) the development of multiple realities within the residential phenomenon. In this sense, more gender and housing specific studies are needed, which consider other populations beyond gender binarism (non-binary people, gender fluid, trans people, etc.). Moreover, it is important to open an interdisciplinary and intersectoral agenda that gathers the efforts being carried out from different spaces in the areas of gender, housing and health.

### Declaration of competing interest

None.

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### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ssmph.2022.101068>.

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