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Mainstreaming a gender perspective into the study of energy poverty in the city of Madrid

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ABSTRACT

The feminisation of energy poverty in the city of Madrid is currently impossible to measure through statistics for those women who are not the main breadwinners. However, a crescent body of knowledge about qualitative research applied to the study of energy poverty has disclosed several aspects related to vulnerability to energy poverty and its impacts. The paper shows the results of a qualitative characterisation of 16 women from Madrid based on interviews conducted during the winters of 2019 and 2020, before and after the COVID-19 lockdown. Four different ways in which gender roles shape experiences of energy poverty are revealed. First, the assumption of responsibility for the home well-being is intrinsically linked to women's identity. Second, how patterns and habits of energy consumption are influenced because of gender. In the third place, how emotions are not only a consequence of suffering from energy poverty but can also help to hide it. Lastly, segregation of capabilities by gender roles from the early age contributes to condition knowledge of household energy management. The importance of reformulating gender inequality dynamics by focusing on personal experience and being able to extract conclusions joining quantitative studies shall be included in future studies.

Introduction

Since Boardman published her work about fuel poverty in the UK (Boardman, 1991), literature about energy poverty has increased. The problem has been recognised as an important achievement and characterised in different ways depending on multiple factors. Although the first definitions were based solely on monetary data, the consensual approach (Healy & Clinch, 2002), which includes the household's subjective perceptions, has been demonstrated more suitable to reflect the complexity of the energy poverty phenomenon. As the Energy Poverty Observatory (EPOV) states, "energy-poor households experience inadequate levels of these essential energy services, due to a combination of high energy expenditure, low household incomes, inefficient buildings and appliances, and specific household energy needs".

Many different disciplines have joined the study of energy poverty in the last decades: from architecture to social sciences (Sánchez-Guevara Sánchez, Sanz Fernández, & Núñez Peiró, 2020) or health (López-Bueno, Linares, et al., 2020), they have contributed to creating a sense of research community based on diversity, tackling the problem by introducing complementary perspectives and integrating visions.

While diverse approaches coexist, understanding of energy poverty regarding incomes and expenses is the dominant approach for policy making (Middlemiss & Gillard, 2015a). But by just focusing on the statistics the lived experience, the everyday face of energy poverty, might get excluded (Groves et al., 2020). But by just focusing on the statistics the lived experience, the everyday face of energy poverty, might get excluded. In that sense, most of the current policies only provide financial assistance instead of focusing on managing access to basic needs, such as housing, employment or feeding.

This work contributes to a growing body of research focused on promoting the inclusion of a new social science viewpoint on energy poverty. The intention of these perspectives is to highlight the lived experience by identifying emotions and how they shape the consequences of suffering from energy poverty (Longhurst & Hargreaves, 2019). This implies that qualitative methods, such as interviews, are incorporated to register everyday dynamics, routines and perceptions. Some studies have gone into depth either by mapping these behaviours (Horta et al., 2019), summarizing the diverse theories and applications to energy justice (McCauley et al., 2019) or by describing the identification of individual householders in order to create targeted intervention schemes (Mould & Baker, 2017).

For policy and practice, the value of understanding subjective experiences helps to improve interventions. It is from the earliest design

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stages, developing the concepts of home, capabilities and emotions, that the understanding of the well-being spatiality can be enabled within policy design (Waitt & Harada, 2019). Furthermore, by reassessing energy poverty strategies including this point of view it is possible to contribute to the co-production of knowledge (Yoon & Saurí, 2019) and the promotion of energy empowerment (Jacques-Aviñó et al., 2019).

While qualitative research on energy poverty has had a growing presence in energy vulnerability research (Bouzarovski et al., 2016), to date gender studies have never taken centre stage (Feenstra & Özerol, 2021a).

The starting point for the investigation takes work division and gender roles as causes of feminisation of energy poverty, hidden by care labours which take place in the private scene (Petrova & Simcock, 2019b).

The aim of this work is to explore the lived experience of feminisation of energy poverty in Madrid through a qualitative approach. This research addresses this objective by conducting semi-structured interviews with a total of 16 women who suffer from energy poverty, and it. As this study is framed in qualitative research methods sample size is lower than in quantitative studies. Several qualitative studies have been explored for this work with a similar sample size (Hargreavesn et al., 2010; O'neill et al., 2006) and share the sample size limitation that impossibilities the conclusions to be generalizable (Pelenur & Cruickshank, 2013).

In this study, the following hypothesis was explored: there are gender differences related to the use of energy routines linked to the distribution of responsibilities because of gender roles; there is a link between energy poverty and caregivers, and these people are mostly represented by women (Nguyen & Su, 2021); energy poverty in these groups of population is not always related to education but to the impossibility of abrogating these domestic labours; there are gender differences in subjective well-being due to construction of women's identity which is coupled to household needs. The interconnection between energy poverty and gender inequality was possible to prove (Clancy, 2016a).

The article is structured into six sections. Section 0 describes the context where the case study was carried out and sets out a theoretical framework, elaborating a common background for the research. Section 0 presents the methodology, focused on the structure of the interviews. Results with participants' experiences are presented and described in Section 0. Next, section 0 comes to understand the feminisation of energy poverty in Madrid, in the light of the results obtained, by identifying women's experiences as an energy poverty pattern. To conclude, Section 0 identifies how gender mainstreaming contributes to getting a complete picture of the energy poverty phenomenon and how it can have an impact on policy making.

The gendered dimension of energy poverty

Introducing gender mainstreaming in research

The United Nations (United Nations, 1996) puts women as a specific vulnerable category due to the higher incidence of poverty compared to men, and also due to characteristics of their poverty: it is more severe and, far from improving, it keeps increasing. Thus, if it is possible to define the welfare of society in terms of use and access to energy services (Aristondo & Onaindia, 2018), women represent the most half of population liable to experiment with particular difficulties to supply elementary energy demands. Although the literature about the feminisation of poverty is quite rich, studies about the feminisation of energy poverty, particularly in the Global North have been developed only in the last two decades (Clancy & Roehr, 2003). Profiles description (O'neill et al., 2006), inequality dynamics (Day & Hitchings, 2011), and policy design (Feenstra & Özerol, 2021b) are in a very incipient phase that still requires comprehensive approach (Longhurst & Hargreaves, 2019).

According to Clancy (Clancy, 2016b), not all sort of data provide the information to know if gender roles and intra-household dynamics are connected to energy access. Qualitative research unpacks what is behind the numbers and describes data in depth (Waitt & Harada, 2019). In that sense, genealogy of gender studies shows a quite range of qualitative methods that is worth to deepening in.

Genealogy of gender studies

According to Harding, here is not a unique feminist method' but distinctive promising criteria in feminist analyses (Harding, 1987). Thus, it is by focusing on women's experiences how point of view can be changed.

Feminist and qualitative methods downsize the scale of analysis by introducing collaborative ethnography (Berraquero-Díaz et al., 2016), which is materialized by interviews. It permits to attend facts that are hidden (Cagatay, 1998) and ensures household participation in order to define more suitable policies (Brunet et al., 2009). The present research was mostly based on fieldwork, to be able to record women's experiences and reappraise the everyday labours which sustain life.

Those profiles linked to social and productive life have historically been widely represented in policies and public debate, and because of that, domestic and care labours have been concealed (Chant, 2008). Therefore, the distinctive feature of feminist research is that it is based on women's experiences points of view (Hanisch, 1970). Anonymity and authority are other points that feminist methodologies try to alter: the relation between researcher and participant is in the same critical plane, as face-to-face encounters are integrated in the research praxis.

Feminization of energy poverty in the city of Madrid

In 2016, the Technical Report on energy poverty in the city of Madrid (Sanz Fernández et al., 2016) was carried out. This report used a methodology based on the income and expenditure approach to which the climatic, building-related and socio-economic particularities of Madrid were incorporated (Sánchez-Guevara Sánchez et al., 2015).

This methodology quantified the percentage of households in energy poverty situation in the city of Madrid. The study noted that about 22.7 % of Madrid's households were at risk of energy poverty. That figure included households that did not usually appear in other studies: those who did not spend a percentage of their income on energy because they could not and, therefore, did not reach a proper temperature in their home. This study also allowed us to quantify the number of households that were vulnerable to energy poverty in Madrid, which accounted for 26 % of the total. The methodology of this study, in addition to identifying the characteristics of the different population groups in situations of energy poverty, allow defining a series of variables that usually characterise energy poverty situations.

Factors linked to energy poverty related to issues such as income and average retirement pension, age and state of construction, availability of climate control facilities in the house, its area and its relation to the number of inhabitants, its tenure regime, unemployment rate or household composition. None of these factors allows for an estimation of the energy poverty situations from a gender perspective except by household composition. After this in detail, the study noted that households occupied by women over 65 years, single-mother ones with one or more minors under her care or those in which the main provider is a woman usually have higher percentages of energy poverty than the average value of the city. In Madrid, in 2016, 22.7 % of all Madrid households suffered from energy poverty, but out of those households with the highest risk of energy poverty, >50 % were led by a woman (Sánchez-Guevara Sánchez, Sanz Fernández, & Núñez Peiró, 2020).

In those households with a woman as a breadwinner, a total of 28.5 % of these households lived under some type of poverty (either energy poverty, monetary poverty, or both). From an income and expenditure approach, 16.6 % of the households expend >10 % of their income on domestic energy needs (twice the median expenditure of the country).

The 9.2 % of these families suffered from both types of poverty (energy and monetary) simultaneously.

In the case of single-mother families, the percentage of households belonging to vulnerable groups is substantial, as there are >40 % of households at risk of energy poverty. In regard to households where a woman over 65 lives alone, there is a high proportion at risk of energy poverty (38.8 %). The lack of disaggregated data hampers the description of the feminisation of energy poverty in those families wherein women are not the household breadwinner, since the household is evaluated as a whole. Despite this situation the current policies aimed at tackling energy poverty, in the Spanish context, do not take into account gender perspective when defining the beneficiary profile (Thomson et al., 2019).

Introducing gender mainstreaming

Mainstreaming gender within the study of energy poverty in the Global North has been studied as an opportunity to improve the position of women, either as a key variable for analysing household energy and air pollution (Cecelski, 2004), as a new dimension to reappraise and focus on gender roles and reproductive work (Clancy et al., 2007), or as to measure thermal perception and health differences between sexes (Karjalainen, 2007) (López-Bueno, Linares, et al., 2020).

More recent studies have focused on how gender analysis could help to understand social inclusion (Clancy et al., 2017), how gender inequality is spatially distributed (Robinson, 2019) and how to introduce gender mainstreaming to change policy design and data collection system (Gonzalez Pijuan, 2017).

Although most of the previous work has followed a quantitative approach, it seems the nexus between gender and energy needs further analysis (Saugeres, 2009). In that sense, female-headed households are impossible to be detected on aggregated household income databases becoming the poorest of the poor (Chant, 2004). Given the information gathered in current statistical databases, women's inequalities regarding energy poverty can only be assessed throughout the evaluation of those households wherein they live alone or are the main breadwinner. On the contrary, the availability of disaggregated data would open many possibilities to unravel intra-household inequalities (Bradshaw et al., 2017), enabling the assessment of women's socioeconomic situation regardless of the household they belong to (Agarwal, 1997a).

Competing demands of the workforce and the family make single mothers more prone to suffer from constant financial instability (West et al., 2017), which also affects to energy supplies. Literature often focuses on describing women as “vulnerable” and “needy”, but without deepening into why women are characterised as vulnerable category (Listo, 2018). Due to both facts, intra-household gender inequality is still a hidden dimension of poverty.

To study intra-household dynamics, aspirations or issues of decision-making in-depth, interviews within ethnographic research should be conducted (Moghadam & Senftova, 2005). Thus, gender mainstreaming focuses on systems, processes and norms that establish inequalities more than describing individuals, their rights or their particular disadvantages.

Attending to diversity among women, there is a need for a gender-aware approach to poverty in order to overcome the lack of specific policies, more than a generalisation of describing women at risk of poverty (Johansson & Kvinnoforum, 2002). The focus should be made on understanding how gender inequalities work more than only describing minority groups (Chant, 1997).

This work has joined methods in order to correct and feed quantitative analysis through qualitative research, by inter-subjective construction. The aim of describing the full process is to show the potentials and limitations of research gender-aware energy system and set a precedent for future works and policymakers.

Methods

As the main objective of this work was to deepen into the lived experience of women in relation of suffering from energy poverty in Madrid using a qualitative approach, semi-structured interviews were chosen as they are the most appropriate form of interview to seek new insights from conversations with participants (Butler & Sherriff, 2017a).

The sample

A total of 16 semi-structured interviews were undertaken during the winters of 2019 and 2020, before and after the COVID-19 lockdown. The sample size was contrasted with similar studies (Day & Hitchings, 2011) (Hards, 2013) to ensure that, although the size of the sample is small compared with quantitative studies, follows the standards used by similar qualitative works (Pelenur & Cruickshank, 2013). Participants' recruitment was managed by local NGOs, who are providers of social housing and had already identified households experiencing energy poverty (Table 2). One of them, Provivienda, is an association providing mediation between owners and tenants and housing and social counselling. The other one, Madrid Municipal Housing and Land Company, is a public company with different functions related to the management, administration and conservation of social housing stock in the city of Madrid. Interviews were carried out with women who lived in households suffering from energy poverty. After informing and explaining the aims of the study, those who accepted to participate were contacted to arrange the interview.

Data collection

The interviews were designed along with the social entities that provided the sample of households. The interview was divided into 6 parts to explore the different aspects related to energy poverty. Categories selected to structure the interview were: (1) aspects related to location; (2) information about housing members and routines, focusing on each member timetable; (3) information about technical household features, including the presence of leak, damp or rot; (4) available equipment; (5) basic demographic and socio-economic identification, questions related to health issues, domestic energy management and awareness of energy use; and (6) subjective questions about well-being and thermal comfort perception. All interviews were conducted at participant's residences, directly to women. For a correct treatment of personal data, names were anonymised.

These 6 parts were divided into 2 different types of interview methods (Table 1). Categories from 1 to 4, related to location, the technical aspect of dwelling and some aspects of socio-economic identification, were carried out using a structured interview with predetermined questions with multiple choice answers. Categories 5 and 6, related to health issues, thermal comfort perception, routines and everyday experience, were asked throughout a semi-structured interview.

All interviews lasted between 30 min and an hour and were coded by only one coder through thematic analysis (Braun & Clarke, 2006). Interviews were audio taped and then transcribed verbatim. This research is focused on the feminisation of poverty. Considering that, the interviews were directed to be answered by women.

The interviews were conducted at two different times with the same sample of participants. The first round took place between September and November 2019. The second round was conducted between September and November 2020, after the COVID-19 lockdown. In order to facilitate voluntary participation and promote a comfortable environment, the first round of interviews was carried out in the interviewees' homes. The second round of interviews was carried out using a mask, preferably at the house entrance and following the instructions of local health authorities. It was also considered relevant to work with an interviewer who is a woman and with a background linked to social

Table 1
Summary of structured and semi-structured interview script.

Category	Type of interview
Identification	
Address	Structured interview
Gender identification	
Age of respondent	
Place of residence	
Origin (country)	
Household size	
Household composition	
Social collaborator	Fulfilled by interviewer
Household composition (detailed) and time spent at home	
Woman <14 years and time spent at home	Structured interview
Man <14 years and time spent at home	
Woman is de main caregiver of <14 years people	Semi-structured interview
Woman 14–44 years, women 45–64, women 65–75	Structured interview
Man 14–44 years, men 45–64, men 65–75	
Woman >75 years	
Man >75 years	
Woman is de main caregiver of >75 years people	Semi-structured interview
Household economy	
Total household income (monthly)	Structured interview
Level of studies	
Gender of household breadwinner	
Housing tenure status	
Housing rent	
Employment situation and type of contract	
Health considerations (for any member of the household)	
Existence of long-term sufferers	Structured interview
Taking medication on a regular basis	
Identification of emotions in relation to energy	Semi-structured interview
Pregnant people	Structured interview
Smoking people	
Disabled people	
Women in charge of disabled people	Semi-structured interview
Energy consumption habits and equipment	
Contracted power	Structured interview
Energy bills (monthly)	
Heating system by space	
Time slot in which heating equipment is working	
Cooling system by space	
Time slot in which cooling equipment is working	
Hot water system	
Cooking energy system	
Heating/cooling equipment's maintenance conditions	
In-home behaviours	
Use of blinds (use during winter/summer)	Structured interview
Ventilation (use during winter/summer)	
Other habits	Semi-structured interview
Housing conditions and bills payment	
Leaking roof, damp walls or rotten windows	Semi-structured interview
Payments of bills	
Personal perception of thermal comfort	
Summer thermal comfort	Semi-structured interview
Heating perception	
Personal strategies to avoid or deal with heat or cool	
Housing technical information	
Dwelling surface	Fulfilled by interviewer
Age of construction	
Type of building (explain)	
Total number of floors/ participant's floor	
Interior rooms	
Windows composition	
Façade composition	

movements and knowledge about the participants' neighbourhoods, promoting nearness to the interviewee (Yoon & Saurí, 2019). The interviewer facilitated work by adapting research schedule of meetings to participant's availability, and not including those members who were too vulnerable that the interview (talking about their personal experiences) could harm them.

Table 2
Variables analysed as determining factors of energy poverty within participants. According to Energy Poverty Observatory (EPOV), "energy-poor households experience inadequate levels of these essential energy services, due to a combination of high energy expenditure, low household incomes, inefficient buildings and appliances, and specific household energy needs"

Percentage of poor for each variable	% households
Ability to keep adequate temperature	75 %
Problems to pay bills	44 %
Leaking roof, damp walls or rotten windows	88 %

In homes where the main breadwinner was a man, or was a woman but living together with a man, it was made clear that questions were to be answered by the woman, preferable without the presence of any other member at the moment was conducted to not condition the answers. These requirements were understood and accepted in most of the cases, with only one case where the man asked to be present in the interview and participated. In homes where women lived alone or were the only adult, there was no need to specify these requirements.

As a result of comfortable and flowed interviews, participants spontaneously invited the interviewer for a dwelling tour, permitting her to comprehend housing context, adjusting and completing participants' discourse. Interviews themselves worked as a space for expression of behaviour in relation to energy, which could be hardly obtained by means of other research methods (i.e., quantitative surveys) (Longhurst & Hargreaves, 2019).

Results

In this section, results are presented organised into two sections. First, the main characteristics of the households are presented as a way to organise quantitative data collection, including housing location and characteristics, demographic and socio-economic variables, health, well-being and thermal comfort perception. Second, it is displayed the lived experience of energy poverty of each of the interviewees, focusing on extracting qualitative information regarding women's self-identity and emotions, household patterns of energy consumption, and environmental perception and vulnerability to bring relations between gender and energy poverty to light.

Main characteristics of the sample

The results are presented according to the different categories proposed:

Table 3
Location, origin and size of the sample.

Profile category	Details
Place of residence	N° participants
Retiro	2
Carabanchel	4
Villaverde	4
Barajas	1
Puente de Vallecas	2
San Blas	1
Tetuán	1
Vicálvaro	1
Origin	% participants
Spain	50 %
Latin America	25 %
Other	25 %
Size of the average household	
3.44	(max = 7)

Table 4
Housing characteristics.

Heating system		% system
Available heating devices		88 %
Use of heating systems		38 %
Complementary devices (electric/butane/heaters)		75 %
Household thermal perception at home in winter and summer (very cold/very hot)		75 %
Housing surface	m^2	
	94.56 (SD = 29,30)	
Year of construction		
<1950	13 %	
1951–1979	37 %	
1980–2010	31 %	
>2010	19 %	
Building typology	<5 floor residential building	
Windows frames	Singled glazed aluminium window	
Façade composition	Traditional cavity brick wall Ceramic ventilated façade Precast concrete panels	

Location (Fig. 1)

Most of households live in a before-1980 multi-family residential building located on Carabanchel or Villaverde districts (Table 3). The housing stock of these districts is characterised for being built between the 50s, 60s, and the 70s, before the first thermal regulation NBE- CT-79 (Real Decreto 12429/1979 Por El Que Se Aprueba La Norma Básica de Edificación NBE-CT-1979 Sobre Condiciones Térmicas En Los Edificios, 1979) was adopted in Spain. Those districts gather the highest social and residential vulnerability rates of Madrid (Hernández Aja et al., 2018) hence combining social vulnerability and inefficient dwellings. Except for one of the participants who was evicted from her home after the COVID-19 lockdown, none of the initial locations changed from the first round of interviews to the second.

Housing characteristics (Table 4)

The average housing surface is around 94 m^2 and half of housing stock does not have any thermal insulation. Among respondents, 75 % of dwellings have some rot in window frames, or leaking roof or damp walls, as well as lack of solar protection. Although 88 % of participants have heating devices available, only 38 % make use of it, while 79 % of them use complementary devices such as electric heaters or even butane heaters for heating. Cooling needs are normally covered by means of electric fans (75 %). Electric system is the most common one for cooking, and water heating is made by gas. Among respondents, 44 % has problems to pay their utility bills last year. After the first visit, housing pathologies were communicated to house tenants. In the second round of interviews, participants were asked about whether the damages that they had previously communicated had been repaired and/or undergone maintenance work. None of the households reported any improvements or maintenance work.

Demographic and socio-economic identification

The profiling resulted in a household type headed by a middle age (average of 47 years) and long-term (around 16 years) migrant working woman, who is a single mother and the primary caretaker for the other households' members. Almost half of the participants confessed having problems to filling in the documents to access to social benefits because of language barriers. Households were typically composed by 3 members, including in most cases a children under-14 and, in a few cases, people over-65. There was only one main breadwinner in the 14–44 years old range (Table 5). The weekly schedule was also studied to know the amount of time spent at home and who is more exposed to the effects of unhealthy thermal conditions. Almost in all household responses, women between 14 and 44 years old and people over-65 were the ones who stayed at home most of the day. The group who represented the opposite was men in the 44–64 age range.

Table 5
Demographic and socio-economic identification I.

Family composition		
Woman main breadwinner	Single-mother with minors	10
	Households with disabled people	1
	Households with retired members	2
Main breadwinner men	Household with minors	3

Table 6
Demographic and socio-economic identification II.

Household monthly income	
Under 450€	19 % (3)
451€–600€	19 % (3)
601€–750€	25 % (4)
751€–900€	13 % (2)
901€–1050€	6 % (1)
>1050€ (Madrid's median income)	19 % (3)

Participants had a median income earnings of 726€ monthly (median income in Madrid is 1028€ per month) (Table 6). Only a sample of 4 people did not complete the primary education. Secondary studies were completed on the rest of the participants and about of 30 % respondents have some complementary and professional studies, characterised by being early leavers from education and training. Employment rate among respondents were 50 %. Almost 81 % of the sample were on precarious employment (having worked with a contract for no >3 months) and, among them, about 30 % worked in home care and residential care employees. During the COVID-19 lockdown, those participants who were employed but unable to carry out their work, changed their type of contract to a new temporary contract type approved by the Spanish Government as an exceptional measure which not decreased drastically the total amount of income perceived. All participants lived in rented dwellings with social rents. Housing cost of tenants renting is about 170€ per month on average, significantly lower than private rents. During the study, 44 % of participants declared to have suffered physical or gender-based violence (Table 8).

Well-being and thermal comfort perception

During interviews, it was common and general not being able to keep adequate thermal conditions in dwellings. Participants indicated they suffered the effects of housing overheating in summer. They matched cold seasons to leaking roof or damp walls and using fleece blankets and winter clothing. Summer was associated to sleeping problems, to be overtired and not spending time at home.

Table 7
Timetable of participants at home.

Staying at home: Women				
	00.00–07.59	08.00–14.59	15.00–19.59	20.00–23.59
<14	100 %	22 %	78 %	100 %
14–44	100 %	64 %	91 %	100 %
44–64	88 %	50 %	88 %	100 %
65–75	100 %	100 %	100 %	100 %
>75	100 %	100 %	100 %	100 %
Staying at home: Men				
	00.00–07.59	08.00–14.59	15.00–19.59	20.00–23.59
<14	100 %	14 %	86 %	100 %
14–44	100 %	20 %	100 %	100 %
44–64	100 %	50 %	50 %	100 %
65–75	–	–	–	–
>75	–	–	–	–

Table 8
Participants' identification.

Age of interviewees	
<30	6 %
31–40	31 %
41–50	38 %
51–60	13 %
61–70	0 %
71–80	13 %
Women <65's educational level	
No-complete primary	13 %
Primary education	6 %
Secondary education	38 %
Upper secondary education	13 %
Professional formation	13 %
Non-recognised studies	6 %
Employment	
Unemployed without social benefits	14 %
Unemployed with social benefits	21 %
Caregiver	36 %
Indefinite duration contract	21 %
Regular contract	7 %
Primary caretaker and main breadwinner	
Yes	81 %
No	19 %
Experience gender-based violence	44 %

Health issues

Regarding long-term standing health problems or diseases, around 66 % of participants reported that they suffered from such problems and within participants 69 % took medication. Detected health problems were related to anxiety in the 37 % of cases, and to respiratory diseases in the 25 % of cases. Among respondents, 20 % had a family member with a disability, in which cases care work was carried out d by another family member, with no external aid. During the second round of interviews, most of the participants replied that chronic conditions and health issues have worsened during the COVID-19 pandemic, especially health problems related to anxiety. Two of the respondents were hospitalized during the period between the two rounds of interviews.

Interviews were strongly marked by emotions. Interviewees were asked to describe their emotions in relation to energy consumption. They identified sadness, worry and anxiety as common emotional feelings (Table 9). In some cases, participants identified fear of getting into debt. More than a half mentioned feeling ashamed about asking for help.

Domestic energy management and awareness of energy use

There was a broad knowledge about basics every-day-routines related to energy among respondents. Almost all participants closed roller shutter to keep the heat inside the house during winter and to protect it from the sun during summer. As participants were not used to using heating or cooling systems, they were not acquainted with technical issues and basic maintenance of devices. The contracted power was the minimum in all cases.

Table 9
Participants' emotions in relation to energy poverty.

Emotions in relation with energy poverty	
Sadness	81 %
Fear	75 %
Anxiety	81 %
Shame	56 %

Table 10
Percentage of heating system usage.

Use of heating systems	
0.00–07.59	19 %
08.00–14.59	31 %
15.00–19.59	81 %
20.00–23.59	56 %

Heating systems were most often used from 15.00 to 00.00 h, coincident with children coming back from school and bedtime (Table 7). The use of cooling systems during summer differs from winter habits since it does not seem to exist a typical or fixed schedule for it. Its use was limited to a few hours, depending on the time spent at home (Table 10).

The use of heating and cooling systems during the COVID-19 pandemic was strongly conditioned by the increase of electric energy prices. Participants indicated different strategies to cope with thermal extremes that modified their everyday habits and the use of house spaces. Actions like concentrating the house heating only in one or two rooms, sleeping together with children in the same room or using several layers of clothing, were more present in the answers collected in the second round than in the first round of interviews.

Energy poverty and lived experience

Interviews were transcribed after each round and analysed after from a gender perspective, with the aim of describing concealing gender social constructions. As a result, the following categories were analysed:

Table 11
Relation between hypothesis explored and results achieved.

Hypothesis explored in this paper	Results achieved through this research
There are gender differences related to the use of energy routines linked to the distribution of responsibilities because of gender roles	It was possible to contrast participants' routines with their energy use. A comparison table is presented, "Table 7 Timetable of participants at home" showing these differences.
There is a link between energy poverty and caregivers, and these people are mostly represented by women	At it is shown in "Table 8 Participants identification" where the characterisation of the sample is presented in. Professional situations and incomes are aggravated by responsibilities and day-to-day tasks.
The feminisation of energy poverty is not always related to educational level or not being familiarised with HVAC maintenance tasks, but the impossibility of overcoming this unknowledge because of some incompatibilities related to domestic labour.	As participants declare, most of them were unfamiliarised with energy issues ("4.2. Energy poverty and lived experience"). Although there are some public resources to help households with an understanding of energy bills and HVAC maintenance, some incompatibilities were found when these activities were scheduled. For example, workshops usually do not offer space for children making it impossible for caregivers to participate.
There are gender differences in subjective well-being due to the construction of women's identity which is coupled with household needs	Participants' responses are collected in "4.2. Energy poverty and lived experience". Four categories were established to manage interview results deepen on women's self-identity and household identity, household patterns of energy consumption, emotions not only as a negative consequence but as a gender role and environmental perception and vulnerability
There is an interconnection between energy poverty and gender inequality	This Discussion section links the deep characterisation elaborated for the sample with interview responses to demonstrate this interconnection through quantitative and qualitative data.

Fig. 1. Geographical distribution of participant's residences where interviews were conducted. Source: authors.

Women self-identity and household identity

Women's identity seems to dilute and homogenise with the whole household's well-being and identity. This was detected in most of the interviews, commonly either masked by the self-devaluation of their own labours,

> "I do nothing, I do home task. I sew or go for a walk, but I do nothing.""I'm at home full day, and I do nothing. Now, I'm a grandmother and my son brings his twins here to sleep some days."

as a part of interruption of their personal development plans or self-comfort and self-care in pursuit of others' well-being,

> "I went for a while to classes to continue my secondary studies, but I stopped because of my daughter. I have been taking care of her for 39 years. I don't have time for self-care. I signed up for an academy to learn maths, but I stopped going too.""My daughter doesn't want me to open the windows because of the streams of air, so I don't open them as much as I'd like.""Electricity bills are more expensive in winter because of the heating systems. My daughter asks for them (radiator), If I could choose, I wouldn't turn them on.""I open the windows when children aren't at home, in the mornings.""We turn the heating system on when my daughter arrives home."

as a result of changing the hierarchy of priorities, placing themselves at the pyramid's bottom,

> "When the accident happened, I didn't want to call for an ambulance, I went home driving myself?""My children's health is all right, and that's the most important thing.""I only turn the heating system on to dry off the wet clothes.""In summer, I only turn fans on instead of the cooling system because my daughter prefers fans. Fans needs to be connected full day, but she can't stand air cooling from cooling system."

or by being worried about failing on the caregiving taken role masking over-control, over-responsibility, and shame.

"I left the ambulance number written down, so my sons could call it in case something happens to me. I warned to my mother and my sister about what to do in case I wasn't available on WhatsApp for two or three days. I'm worried about my family in case something happens to me."“They don't allow me to take more food from beneficiary because I have been going there for too long. They proposed me to look for another place to go, but I'm ashamed to go."

Household patterns of energy consumption

Description of energy consumption is conditioned by everyday care habits. Forecasting incomes and expenses were normalized to anticipate future situations or future expenses related to repairing devices or other household expenditures. Women were usually involved in the elaboration or monitoring of these budgets. Their personal needs were often excluded from these budgets:

"I always save part of the incomes for her wheel-chair maintenance. She (the user) must be comfortable, and half of my own incomes goes to this."“If something happened to me, my daughter would be in a residence, and my house would be for my grandchildren."“They recommended me to install an electric water heater tank until I have the money to pay a gas water heater tank after two months using cold water."“Window frames are broken, and I fix one each time I save enough money. Last year we didn't go out for holidays to pay repairs. Currently, I'm selling my mom's jewels."

Emotions not only as a negative consequence but as a gender role

Interviewees expressed emotions such as fear, worry, and anxiety due to not being able to handle uncertain situations related to dwelling. There is also a typical confusion between sadness and anger due to social-emotions construction, as reflected also in previous studies (Brody, 1985):

"I experienced anxiety several times because they wanted to evict us."“I was taking pills because of anxiety, to relax me. I don't want to be medicated because I must take care of my daughter and I'm worried about being sleepy. Last night I woke up 3 times with anxiety and I didn't know why."“I'm so anxious to not be able to pay the bills. I'm scared to be evicted. I'm so sad because I'm unemployed, in other case I wouldn't be this way."“Although the social worker tries to calm me down, I'm not able to sleep at night due to the anxiety."“This flat was my mother's flat. She was evicted, and I was so sad because they removed her from her flat."

Moreover, it was detected a tendency to erase problems based on answers that ignore, remove o re-explain evidence of energy poverty, or answers that reflects that everybody struggles with complicated situations, downplaying the importance of their problem:

"Everybody has issues."“Everybody feels sad."

The impossibility to overcome mental block was detected as well. Many interviewees felt ashamed of asking for help after having bad experiences related to discrimination or social rejection, in most of the cases based on racism, prejudices or stereotypes:

"Once I asked for social dental welfare benefits and they rejected the request. After that, I don't want to ask for this benefit again, so I'm searching for a low-price service. My friends tell me to insist, but I feel ashamed of asking as they already said "no, we don't"."“I'm so embarrassed to ask for help anywhere because they always attacked me and insulted me because I'm gipsy."

Environmental perception and vulnerability

It was possible to define some relevant aspects related to environmental perception by taking into account context descriptions. The interviews focused on several points shaping vulnerability and working on normalizing precariousness (Roberts & Henwood, 2019), sometimes explained by racist comments:

"No one wanted to help me with energy bills. It was logical, I was working as a street peddler."“I'm so embarrassed 'those' people way of life, they are rude and don't respect public spaces. They say they don't have enough income to pay electric bills, but finally they have such a house. They are a shame for everyone, police are here every time because of them."“Here we are not all the same. You go outside and you are mentally blocked because of 'their' behaviour."“My neighbour has her place in a very bad situation. We need special services to disinfect her dwelling."“We all sleep in the living room on summer, it is impossible to sleep in the other rooms. It is so hot at summer."“I don't use sunshades because 'they' could burn it throwing cigarettes."

Women speech was also full of assumption of lack of maintenance of energy devices or window frames, due to being unfamiliarised with home repairs skills:

"My grandchild used to repair my heaters."“As I don't have curtains, I try not to raise blinds, just a little bit to let air in. During summer, I raise the blinds, but we don't have sunshades. Because of that we don't use the living room because it's hard to cool or heat it."“I don't use the thermostat; I don't even know how it works."“Window frames are too old; they need to be fixed."“It takes almost a year for any repair to be done."

Discussion

With respect to the limitations of this study, the following should be mentioned: firstly, the generalizability of the results was limited by the size of the sample ($n = 16$) as it happens in similar works (Petrova & Simcock, 2019b). The small sample together with its spatial dispersed pattern point that further qualitative research should be done. Qualitative methods allow researchers to touch on the lived experience of energy poverty (Middlemiss & Gillard, 2015) by exploring subjective aspects. These studies give relevant information but some of its logistics sharpen data's quantity (Pelenur & Cruickshank, 2013). Thus, it is important to highlight the relevance of combining both qualitative and quantitative methods in order for the conclusions to be generalizable (Butler & Sherriff, 2017b).

Secondly, it is well known how administrative datasets are collected; most of them could be broken down by sex, to have the individual as the basic unit of analysis. Instead of that, providing a dataset having household as a unit (Agarwal, 1997b) only let analyse those households where the main breadwinner is a woman. Due to this disadvantage, these profiles were more represented in the sample.

Thirdly, the lack of cooperation between agents (local NGOs, providers of social housing, social workers) hinders working with participants and implied a constant interruption of interviews. Participants declared that providers of social housing do not resolve household's problems related with energy services; that, although local NGOs give advice about social tariffs, cannot manage maintenance of energy devices or repairs; that, although social workers are the mediators who are responsible for verifying the household's (in)ability to meet the energy expenses, they do not give advice about social tariffs. As the interviewer was not any of the agents mentioned, respondents asked for help to change the tariffs or handling of administrative formalities and repairing deteriorated heating or cooling devices. Considering that it was impossible to providing help during the interviews, an energy-consumption-guide was designed to be distributed between participant households. Although the sample is distributed following a dispersed pattern, profiles and intra-households dynamics show similarities. The analysis of the geographical distribution of interviewee's locations concurs with the districts with higher concentrations of women

suffering from energy poverty (Centro, Tetuán, Carabanchel, Puente de Vallecas, Villa de Vallecas and Vicálvaro districts), and focuses on two household types: single-member ones made up of a woman over 65, and single-parent ones led by a woman. Both targeted groups have been identified in previous research among the most vulnerable to energy poverty (Sánchez-Guevara Sánchez, Sanz Fernández, & Núñez Peiró, 2020). These districts and groups concentrate on multiple aspects related to technical features and socio-demographic conditions that contribute to vulnerability.

During interviews, it was possible to confirm the direct consequences of the impact of thermal extremes on the health of people suffering from energy poverty situations (Wolf et al., 2010). Results show that respondents suffer from different illness related to respiratory problems and other health problems linked with exposure to thermal extremes, as has been shown in some papers either for winter (López-Bueno, Linares, et al., 2020) or summer (López-Bueno, Díaz, et al., 2020).

Related to COVID-19, as other studies have pointed out (Carfora et al., 2021), the socio-economic effects of the pandemic will be shown not in a short-term period but in the following years. Thus, socio-economic and energy poverty effects were not too evident in the second round of interviews since they were conducted immediately after the lockdown ended when there were still exceptional measures in place such as employment-related measures, loans or moratorium on debt repayments.

From the interviews, it was possible to detect a series of common general characteristics in the gender roles that structure energy poverty, and that have been compiled in four groups. The first of these is the construction of the identity of women intrinsically to that of the household, reflected in a self-devaluation and interruption of their own tasks and interests in benefit of those of others as it was shown previously by other studies (Longhurst & Hargreaves, 2019; Petrova & Simcock, 2019a). This implies the assumption of responsibility for the well-being of the home as the backbone of one's identity. The second, referring to the environment of patterns and habits of energy consumption, has made it possible to detect how the interviewees suffer greater exposure to the consequences of the lack of thermal comfort by giving up energy services. By reserving this expense to the slots in which other household members are present. This aspect would be linked with studies that conceptualise energy poverty from a capabilities perspective (Day et al., 2016).

The third characteristic is mental health and emotional patterns related to energy poverty. This feature makes explicit reference to mental blockade in requesting aid and the trend towards normalization of the energy poverty situation as a problem as has been previously explored within studies focused on emotions and how emotions shape experiences of energy poverty (Longhurst & Hargreaves, 2019).

The fourth feature includes those aspects of statements related to context and vulnerability. A majority trend towards decentralization of problems has been detected in benefit of growing hate speeches, with different racist references and to problems of coexistence, as also is pointed out in other researches (Van Dijk, 2009). It is worth stressing that this fourth category includes segregation of the maintenance of energy facilities and equipment by gender roles, as well as general knowledge of household energy management as has been explored in other works (Clancy, 2016b).

These features reinforce the growing body of literature focused on establishing a relation between energy poverty and gender by analysing available data (Sánchez-Guevara Sánchez, Sanz Fernández, Núñez Peiró, and Gómez Muñoz, 2020). These results confirm the hypothesis also for those cases where the woman is not the main breadwinner, and hence are invisible through a quantity analysis (see Table 11).

Also, similarities and differences were founded between those households where women were the main breadwinner and those where they were not the main breadwinner. Regarding the sample, between 16 households participants in 3 households women were not the main breadwinner. In those cases, women have no direct access to this money and added to the task of forecasting household spending, they depend on the availability or not of men's incomes. For one of the cases, the man was living in the same house and he cooperates with this management, but the other two participants declare not having direct contact with the main breadwinner. For these two households, forecasting incomes and expenses were extremely difficult and, during some months they did not receive the money, or sometimes the money was not available on time, and they had been unable to pay utility bills which means to be exposed to disconnection.

Conclusions

The main objective of this research was to deepen the characterisation of the feminisation of energy poverty, as well as to address the dynamics that structure gender roles and access to energy. Within this characterisation work it has been possible to analyse both location data, housing status, demographic and socio-economic profiles, health-related aspects, domestic organization, consumption habits and thermal perception, as well as the statements of the interviewees regarding their vital experience.

This research confirms the link between energy poverty and gender through the fieldwork carried out in the form of interviews. Through analysing interview responses it is possible to conclude that those profiles dedicated to developing caregiving tasks, together with gender roles, are associated to suffer from energy poverty regarding both quantitative and qualitative results from this study. Feminisation of energy poverty is just another way of gender inequality. As a response to this structural problem, (re)distribution (Lundberg et al., 1997), representation and acknowledgement (Fraser & Bedford, 2008) of gender role labours commendation measures must be taken, in order to guarantee women's right to energy.

To carry out this study, first, it was necessary to understand the multidimensional nature of energy poverty, in which the problems arising from not being able to cope with housing energy costs such as living at inadequate temperatures are intertwined with more complex problems related to mental, physical, emotional, social integration effects and the persecution of autonomy. This heterogeneity of situations is where we find the connection between energy poverty and gender, since the unequal distribution of tasks associated with gender roles underlies one of the causes by which women are most affected by energy poverty.

These findings point to several policies, practice and research implications. There is a need to improve the characterisation of the problem by means of indicators that reflect situations of inequality. Open questions were full of emotions and subjective information would have been impossible to register with a predetermined survey. Thus, the best characterisation of the situation of women suffering from energy poverty depends on better data collection that incorporates indicators capable of reflecting gender-related inequality situations such as dependants, time spent at home or devoted to caring tasks. For this purpose, qualitative methods and participatory processes are essential to better indicators be defined, which can reflect balance in life and family. The need for renewed concepts and frameworks demonstrates the importance of working on a new perspective able to express novel approaches to human experience (Del Valle, 1993).

It is crucial the incorporation of women's experience in policy development, through representation, recognition and redistribution, in addition to new analytical methodologies that will shed light on those aspects that were invisible until now, in order to implement a perspective and a multidimensional policy design with a greater anchoring to the daily experience of the right to energy (Tsagkari, 2022). Registering women's experiences in relation to energy access permits to elaborate a complementary framework that can enhance policy design. More broadly and importantly, exploring new formulas connected with social economy, combining professional training programs, energy retrofitting and sustainable and innovative energy system transformations are

some of the multiple future research fields. Simultaneously, it is essential the alternative design of solutions for an energy transition towards more affordable supplies on urban contexts.

For future research, this work points towards the importance of the incorporation of care activities in the assessment of household energy needs. For example, the amount of time spent at home or the need for special devices for people with dependencies. This would entail a differentiated evaluation of households entitled to an electric or thermal social bond benefit. Methodologically, this work sets a precedent for including the analysis of the vital experience surrounding energy poverty and shows that it is essential to delve into the dynamics of the phenomenon and to complete the strategies developed so far in the area of housing renovation and rehabilitation (Ellsworth-Krebs et al., 2021). Similarly, it also poses a series of cross-cutting challenges around how other social categories different from gender may also be related and condition access to energy and establishes different patterns that complete a characterisation that encompasses more profiles.

In the upcoming years, further research should be developed in order to record how COVID-19 impacts women, how indoor dwellings usage is transformed and their effect on caregiving tasks. Currently, measuring COVID-19 effects only returns a dynamic scenario sustained by temporary measures such as employment-related measures, loans or moratorium on debt repayments.

Given the aforementioned current lack of supporting literature on this topic, focusing on the incorporation of fieldwork as an analysis tool, calls for a sustainable energy transition where people and their vital experiences are at the centre. An alternative model of energy consumption requires reviewing consumption habits and supply methods. A different model of sharing tasks assigned to gender roles involves examining the current division of industrial/domestic spheres.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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