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Inequalities with Participation of Colorectal Cancer (P-CRC) Screening: A Systematic Review

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Abstract:- Inequalities has linked with participation of colorectal cancer (P-CRC) screening. However, the methods (Mets) to approach the people to come are up to date/unclear to effect of the P-CRC screening rate. Objectives: This study aims to determine socio-economic inequalities in P-CRC screening in the world. Methods: The search was conducted based on PRISMA-E 2015 criteria from the periods of 2008 and 2018. Data extraction and qualities assessment have reviewed by two experts. Results: Of six studies by socio-economic inequalities in the P-CRC screening from the study indicated that higher P-CRC screening rates have been found in females than males. In addition, the Mets to approach the people to come were reduced inequities difference to increasing the P-CRC screening rate. However, differences age, gender, income, accesses to health care have affected the P-CRC screening used to the populations across groups, and individuals/both. Conclusions and Discussions: The socio-economies risk factors were the main key points to join the P-CRC screening separating according to disparities areas.

Keywords:- *Socio-Economic, Inequalities, Disparities, Inequities, Colorectal Cancer Screening, Participation.*

I. INTRODUCTION

Colorectal cancer (CRC) is the 2nd in female and the 3rd most common cancer in male worldwide, estimated of fifty-five percentage of cases originating in the better of developed parts of the world[1]. Particularly, inequities with P-CRC screening: A systematic review was characteristics of personality, access to health insurance, socio-economic status (SES), and geographies in Lowest –and Middle-income Countries (LMIC) [2-4]. Those state relied the unclearly on key points. Of those suggest that is the assessment of how to increase of adherence rates [5-7] or affects association with adherence of P-CRC screening [8-11]. These are opportunities to explain, identify on risk factors of socio-economic inequities in P-CRC screening [12], respectively.

Previous studies, P-CRC screening guideline was being published and still conferred to identifies the risk of factors related with CRC screening participation test[6]. In 2015, these was began on younger participants, females, ethnic minorities, low household income, low level of education, and not having a marry were the most frequently reported barriers [3]. While those were published up to date identifies the relationship to P-CRC screening among limitations of semi-urban to our knowledge, and no systematic reviews[13]. Moreover, the evaluation of the risk factors related with P-CRC screenings have no studies up-to-date with inequalities and relied on unclear[14]. Then, aims were to identified the systematic reviews on the daily activities such as; inequalities, that could early prevention and early detect, to human life in terms of their relationship among opportunities and increased of P-CRC screening based on semi-urban, urban subjects [12, 15, 16].

II. STATISTIC ANALYSIS

i. Definition of terms

This study has identified of inequities with P-CRC screening in the world for the systematic review. These were to get an identifies and novel risk factors by group-levels of socio-demographic, economic, access to health base on variables from websites online at the period of 2008-2018.

This study was data collected by using exclusions and inclusion criteria, and data analyzes by using the PRISMA-E 2015 checklists [17]. These studied of database complex of inequalities with P-CRC screenings in Countries.

ii. Search Strategy

Using P-CRC screening was detecting the socio-economic inequalities in the world. The searched online forms PubMed and Science Direct to identifies the pertinent publications. Those used the 3 keywords, “colorectal cancer screening”, “participation”, and “Socio-economic inequalities” to search engine on the online of the data bases that to identify search strategy from PubMed and Science Direct databases. Search date Jan 23, 2020, and as mentioned above see in Figure 1.

iii. Selection criteria

This research used identifies of inequalities of the summary domain name, setting, and population for P-CRC screenings in Countries online. These used to the selecting criteria for the journal included our study on those items; about of 2008 and 2018, only database complex will be included, the socio-demographic factors data designs are available. These, including of the full-text based on English published of journal online that have been available.

iv. Data Extraction and Qualities Assessments

This research used design of their part used to a systematic review of controlling to the system of searching, reviewing, selecting, and identifying. These were a pilot study that we used identified the data base of inequalities with P-CRC screening based on the website online. Moreover, two reviewers are used to: one from the Faculty of Public Health, Khon Kaen University, and another come from the Faculty of Public Health, Valaya Alongkorn Rajabhat University Under the Royal Patronage. The main effects were considered, including "Domain name", "Database complexes". If two reviewer agreements among the same way regarding all the data base complicated, and keywords were reviewed and included. If disagreements were decided, and discussed by used to the researcher's team.

This research of the variables outcomes base on the study were recorded; to summary of main outcomes, the domain name, or counties where the study, the number of cross-sectional studies, were important, the data collection, the main finding, and primary outcomes measurement, by used to data analysis e.g., P-value as below in **table 1.**

V. Statistical analysis

This research was statistics analysis to an endeavor to the collected all pertinent in the systematic reviews used of the twenty-five studies reporting relationship of inequalities with P-CRC screening. Firstly, to sum up of author's, inequalities data reports have reported that the main outcome, the domain names represent the overall and primary outcome. Secondly, to identified of inequalities in P-CRC screening relevant or these showing of relationships with main outcomes included inequalities risk factors, respectively.

III. RESULTS

A. Literature Search

Overall, this research has included of that systematic review reported by the identifying of relevant studies used to the processing of inequalities with P-CRC screening in Worldwide. Of those at 133 journal articles form publication online are PubMed and Science Direct databases. These are relating to the data collection met of a cross-sectional study, the outcome of the measurement, and the main finding. Twenty-three journals have shown that out of the 113 novelties Mets of the specific criteria for exclusion, No Journal article, No Colorectal cancer screening risk, and none of published that period of 2008 to 2018. However, we have defined as characteristics of the selected studies base on article type excluding in our study. While additional eighteen relevant journal have discovered from the referring to domain names and two experts that to reliable and valid. If we can be for the journal articles to immediate acceptance and if we can't use for the journal articles using the teams discussed of the chose to make it a total. A total of six journal articles reviewed of this study come excluding using free-full text. Nevertheless, inequalities with P-CRC screening in semi-urban designed to include this journal review was owing to the more likely of cross-sectional studies databased the risk factors in Worldwide. Also, this study is the outcome of measurement were aged groups, gender, marital status, education level, occupation level, housing tenured, Car ownership, Time as a resident, health insurance, physician discussed, and family history of colorectal cancer respectively. We are generated three variable groups by rural-urban areas of risk factors based on socio-economic inequalities in P-CRC screening Worldwide as follows below.

These evidence of socio-demographic variables has shown that the summarized of primary outcome base on the journal in Worldwide. These are the domain names to represents one aged group, gender, marital status, education level, and Time as residents. Those studies have shown that under stills to outcome measured of rural-urban areas. However, evidence for economic variables was, to sum up of variables were household income, occupation level, housing tenured, Car ownership. We are under the control of rural-urban areas are stills of Non-modifiable and Modifiable Risk factors. Several studies were up to date of non-Modifiable factors, for example, age groups, gender, family history of colorectal cancer relating to Socio-economic inequalities in P-CRC screening outcomes, are associated among female than male, and Modifiable Risk factors. For instance, marital status, household income, education level, occupation level, health status, Car ownership, house owner health insurance, physical discussions relative to the P-CRC screening rate, and strongly recommend that more likely to quintiles range of SES variables. However, evidence for access to health variables defined by the health insurance, familiar history of colorectal cancer, and Health status to performances on outcomes. However, these studies of Socio-economic inequalities in P-CRC screening in Worldwide are the main findings. For instance, the participation rate of CRC screening, benefit and awareness of P-CRC screening, promotion of uptake FIT test for equal of inequalities with cancer mortality, A multitude of psychological factors and lived experiences that see in table 2 respectively.

While other variable issues couldn't be land tenured, occupation level, agriculture, farm, and others are the best way to get the main findings in Thailand. Therefore, firstly, we will be novelty more issues to represent the coverage of evidence for socio-demographic outcomes were education level, marital status, age group, and Time as residents. Those studies have shown that under stills to outcome measured of rural-urban areas. Moreover, evidence for economic variables was Land tenure, facility ownership, Number of households. Finally, evidence for Health variables was Health accessibility/ (Health Service, Health information, Consult, Communication with health officer). These studies were under rural-urban areas by beings of non-modifiable as well as Modifiable Risk factors which could be explained to as follow below.

B. Evident for Gender:

The gender inequities seen in the non-family history group with the group was non-significant in the group a familiar history of colorectal cancer. Male has been related with receiving another type of CRC screening outcome. But female and male were most the un-related to other lifestyle behaviors. Some few cases in which familiar history of colorectal cancer was significantly related with lifestyle

behaviors -e.g., physical activity among White females, smoking among Asian Latino and White males-individual level with a familiar history of colorectal cancer had lower odds of attendant to recommendations than those with no familiar history of colorectal cancer.

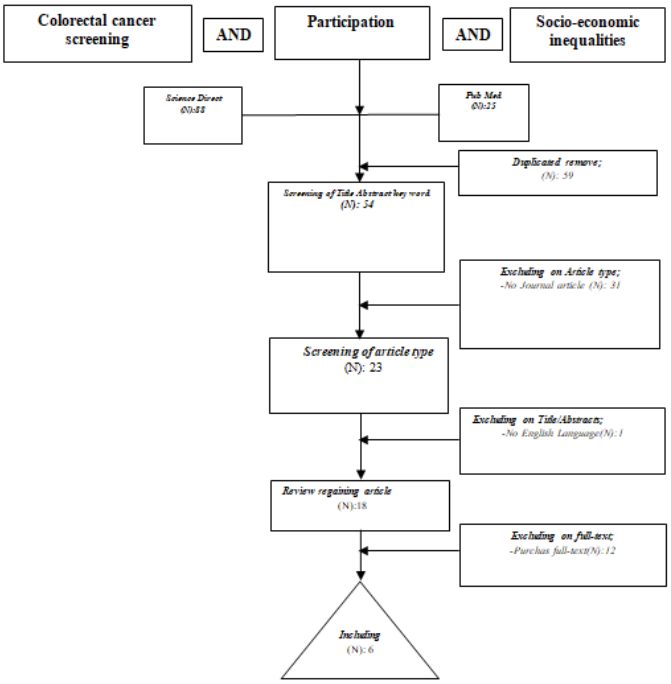

Fig 1: - PRISMA-E 2015 checklists for identification of relevant studies for inequalities in P-CRC screening came from PubMed and Science direct databases. Search date Jan 23, 2020.

C. Age groups:

The mean of age groups for P-CRC screening were 62.5 years, among being of 45 and 75 years in semi-urban area. The lowest definitive attendance rates were among semi-urban subgroups at 70 to 74 years (73.9%), Alaska Natives or American Indians (77.8%), African Americans (75.6%), New Mexico (69.3%), divorced, single or separated (76.8%), and living in semi-urban of counties among persistent poverty (79.6%).

D. Socio-economic status (SES):

The higher SES deprivation levels were persistently correlated to increase the CRC mortality rates, with both male and female. Male and female in the two most-deprived groups had 25% and 15% higher risks of CRC mortality than their most-affluent counterparts, respectively. The researched of the multi-level analysis stratified based on semi-urban areas. The correlation between stage at diagnosis and SES were showed in 3 different models, which each showing an area of semi-urban status. SES relied on the strongly correlation among stage for diagnosis and individuals living in semi-urban areas. These SES level increased, adjust odds of period of tree-four stage at diagnosis decreased. Individual level with the highest SES suggested important significantly of the reduced adjust odds with four-stage diagnosis, when equated to these based on the lowest SES in semi-urban areas.

E. Education levels:

The education levels were significantly different with the semi- urban areas. However, semi-urban respondents, 75.5% had successfully more than high school, when equated to (65.0%) in the urban areas.

F. Place of residence:

Population lived in semi-urban, urban subjects were most of the P-CRC screening. Only about 4% and 3% of P-CRC screening lived in small semi-urban residence and, large urban residence. Significantly, these the mostly semi-urban residents (31.3% - 52.1%) reported ever having a growth or polyp removed from their CRC, when equated to urban residents abouts (28.3 – 68.5%). Only (58.8 - 86.9%) of these from semi-urban countries had each person they are considered by physician discussion, equated to 94.8% of those from an urban country. Semi-urban residents were less likely to have physician discussion in the last 12 months for a check-up. Adjust odd within Place of residence variables, semi-urban residence was related among lower likelihood of being up-to-date and any P-CRC screening. These are non-significant differences were observed among those who have ever received P-CRC screening. However, urban residents were less likely than semi-urban, and urban residence to be up-to-date on any form of P-CRC screening.

G. Race and Ethnicity:

Race and ethnicity were significant for both family history of cancer. However, the race and ethnicity inequalities (Asians, Pacific Islanders, Latinos, and other race compared to non-Latino whites) seen in the group with no family history of cancer were only evident among Latinos compared to non-Latino whites. Latinos reporting no family history had 0.74 times the odds of being P-CRC screening for compared to non-Latino whites.

H. Health system arrangements:

Health system arrangements were asked to recall if they asked their health care provider, or were asked by their health care provider, about tests to detect CRC. Overall, about half of respondents indicated that their health care provider discussed CRC screening with them. However, only 1in5 reacted to ask their health care provider about P-CRC screening. Most reacted to the health insurances and had one person they identify as their physicians discussed and health care provider. Moreover, health system arrangements who reported their physicians discussed, and health care provider of P-CRC screening for their last check-up were important significantly likely to have received a Fecal Immunochemical Test (FIT). Have a shortage of Health Insurance and not having an annual physician follow up have performances significantly related with P-CRC screening in both familiar history of cancer.

I. Baseline conditions:

In these programmed improvements socio-economic inequalities in P-CRC screening statistics may simply reflect a change in the population living in an area and the original population may not have benefited from the improved living conditions. These reviews only looked at studies where changes in health for the original population were being

investigated rather than changes for the areas. The studies covered a wide range of housing improvements in high-income countries, and conducted in the 30 years and older, included refurbishment, rehousing, relocation, installation of central heating and insulation. Few studies examined changes in P-CRC screening following rehousing from slums. Overall, improvements to housing conditions can lead to improvements in socio-economic inequalities in P-CRC screening. Improved socio-economic inequalities in P-CRC screening is most likely when the housing improvements are targeted at those with poor health and inadequate housing conditions.

IV. DISCUSSIONS

A systematic review of inequalities with P-CRC screening was the discussion using by the fourth paragraph. Firstly, these studies were to determine the overview. Secondly, non-Modifiable, and Modifiable factors are defined. Thirdly, the measurements for participant rate were described. Finally, the conclusion and discussions of this study was provided as follows.

On the whole, systematic reviews were strongly that there have been female than male base on inequalities with P-CRC screening, worldwide[18]. Especially the systematic reviews have indicated that non-modifiable factors were the list items (i.e., yes/no, or unknown) for family history of CRC variable. Most studies of participation in other cancer screening have shown that the family history of cancer variables was father, mother, sister, and brother. These studies have also shown that novel able for modifiable factors of socio-economic status (SES), for instance, household income, occupation level, education level, houses, and car owners to representing the 1-5 quintiles rang. The modifiable factors have more effect the assessment of how to get the screening of participation rate [19-22].

Non- Modifiable factors were only included in studies of demography for Socio-economic inequalities in P-CRC screening that the majority on age group on still getting rang at 5-10 years old such as 50-54 or 50-59 because it's a properly identified problem that efforts to help important prioritize. In the previous study, aged group has observed variables and differences of participants opportunist CRC screening[23]**.** Especially Socio-economic inequalities in P-CRC screening are divided among age groups were 45-49,50-54, 55-59, 60-64,65-69, and 70-74 when the following was associated between P-CRC screening and aged 70 over older [18, 24]. Socio-inequalities were using to SES variables of most important risk factors in CRC screening [25, 26]. In this study of gender is being male have affected to the highest level with a participation rate that several studies were female to representing the difference is that predictable and utilizes of P-CRC screening [27, 28]. However, family history of cancer is novelty the only way of getting to demography variables [29-33]. Recently, studies suggested that the Socio-economic inequalities in P-CRC screening was an independent variable that has categorized, and two latent variables such as the Carstairs index –e.g., household income, facilities ownership person in households, and occupation level. Demography including aged groups, gender, and urban-rural areas on the pathways through inequalities[34]. These were measured direct, indirect, and total effects on the Socio-economic inequalities of P-CRC screening [35]. Some studies regarding the socio-economic status for P-CRC screening, modifiable factors have been represented by the social inequalities in cancer screening with specials reference to South Asian Countries have shown that modification overtime was also evident and recently. Those have a clear shift to increasing breast cancer, particularly in much more educationally female [36]. In 2014, theses has been a study for associations of Self-rated Health (SRH) and Socio-economic Status (SES) with Information Seeking (IS) and Avoiding Behavior (AB) among Post Treatment Cancer Patients have shown that associated among SRH on highest level among female, and education level [37]. However, the Jordan Breast Cancer Program (JBCP), was confirmed the being of poor-rich bias in the rates of breast and cervical cancer (CV) screening. These have indicated measurement that females living in the lowest SES were less likely to benefit by early detection and intervention programs [38]. Moreover, the JBCP rate of SES in 2012 to represent the per capita GDP rose from 4,289 US$ in 2005 and 6,100 US$ [39]. Of those was socio-economic and social deprivation that much immediate attention of effort to get an individual, family, reason areas, and Countries among Socio-economic inequalities in P-CRC screening, respectively.

Our studies were representative of the geography defend on rural-urban areas for Socio-economic inequalities in P-CRC screening in the World issues. Previous studies pointed out that the represent of P-CRC screening has shown that the estimated median participant's rate across the county, states, and regions [16, 40]. Especially, measuring of SES in male and female have suggested that the strongest association with a stage at diagnosing across individual levels when compared with the lower-SES category [41, 42]. Urban of inequalities were driven by used measuring of SES among income level, occupation level, educational level, car owner, house owner, and time as residents have that the most performance risk factors of Socio-economic inequalities in P-CRC screening [25]. Those were the significant observed variables inequalities in health based on rural-urban areas, across individual levels, or both level [43]. Moreover, recent studies have shown that the Carstairs index can also be measured of deprivation index legitimately over urban. These were shown more likely of quintiles range (1-5) that approved measurements of SES variables [44]. However, some studies where the systematic reviews of prostate cancer represent the influent of the advanced stage in rural-urban areas. While some investigations were taken into account: geography variables required to look beyond just the rural-urban areas separated [45]. Those were grated influence could be areas that straddle the typical rural-urban areas split, which should be difficult to achieve in practice. Those were particularly so when using administrative or registry data, and temporal changes in geographical classifications [46]. Our studies, the event, access to health were health status, health insurance, and physical discussion. These few limitations that particularly its absence of description of how to participants interested Socio-economic inequalities in P-CRC screening

would pursue testing for instance contact primary care by the general physician (GP) for referral, wait for the next assignment or register online and these lack of generalizing ability to populations other than male [7, 47-49]. However, the previous study has shown that the majorities of people were exposed to health information on Postcode, Letter invites, Internet online, and Television, the lowest level of apprehended of cancer as a result [50]. P-CRC screening was a latent variable, and the proportion of which screening that majority the attendance rate come from male. While all observe variable of P-CRC screening in urban and rural used telephone invitation were the lowest level, letter invitation, and neighbored invitation (face to face), respectively. These have suggested that effectiveness of intrusion to increases CRC screening [51-53]. Moreover, those were moderate pathway issues in the link for P-CRC screening that has been high association with inequalities [54]. Few studies also demonstrates that the being attendances of P-CRC screening among males remains higher than among females [22, 55]. Therefore, relevant on met of variables used; the inequalities factors such as household income, education level, occupation level, house, and car owners base on five quintiles rang was a novel technique to more determining of inequalities with P-CRC screening [56, 57]. Moreover, health status and health insurance representatives, which the exertion into the constitution of non-participation[18]. These were via the early detection of early prevention and primary health care systems for instances the GP, non-health technician and another health technicians [18]. There was an increase in participation in CRC screening programs [19].

In conclusion, our studies have focused on semi-urban areas conditions that have been divided into 3 types were socio-demographic, economic as well as access to health variables. These studies were the modifiable and non-modifiable factors that living associations of socio-economic inequalities in P-CRC screenings among females. The novelty of the demography variables was the SES variables could be mean attributed to the quintile rang (1-5), and the family history of CRC was awareness about the much likely to perform of early detection of CRC screening. The geographies variables were the highest level of rural-urban areas under the risk factors of rate detection. Moreover, the access of health insurance variables increased the participation rates, such as, the physical discussion and health status. Those were related with an increased participation rate, and SES was also related with an increased acceptance of P-CRC screening, of reduced to inequalities in education level, which lent supportive of the importance of empowering age group about their health through practicing self-examination. Of those studies tacitly the requirement for actionable strategies to increase the P-CRC screenings rate is through reducing socio-economic inequalities. Nevertheless, while clarification of this is a performance variable for the systematic review of socio-economic inequalities in P-CRC screenings in Thailand. While novelty issue was land tenured, occupation level, agriculture, farm, and other variable is the main findings as follows, firstly, we will be using more issues to strongly coverage of evidence for Socio-demographic variables were education level, marital status, age group, and Time as residents, Secondly, evidence for economic variables such as Land tenure, Facilities ownership, Number of households, and improve housing. Finally, evidence for Health variables was Health accessibility/ (Health Service, Health information, Consult, Communication with health officer). However, the methodology studies were compared to the using of different urban and semi-urban classification schemes should be useful in deciding. These measures were used in future studies of this SES in P-CRC screening. To sum up, our studies were guidelines to support of institute, researchers, and point out to CRC screening variables under semi-urban areas by beings of Non-modifiable and Modifiable Risk factors that should have to study's in Thailand as followed us [58-60]. Limitation of this research has been lowered, rely on P-CRC screening in Worldwide that will be justifiable with several others [18]. If these was the collected sone countries have shown that important includes the inequalities with P-CRC screening in semi-urban subjects [18, 61, 62].

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Conflicts of Interest

The author declares have no-conflict of interest with journal exists

Table 1 Summary of domain name for inequalities in participation of colorectal cancer screening

Main Outcomes	Domain name /Country	(n)	Designed	Main finding
Socio; Age groups, Gender, rural, urban, household income, race and ethnicity	[63] United Kingdom	2,600,000	Cross-sectional study	Age groups less than 50 Participation rate of CRC screening, Promotion of uptake FIT test, to equal of socio-economic inequalities in cancer mortality
Economics; Gender, Marital status, Age groups, Education Level, Semi-urban, Urban, Household income	[64] Italy	151,000	Cross-sectional study	Participation rate of CRC screening, Practice coverage levels and to equal of socioeconomic inequalities in the access to evidence-based screening
Gender, Age groups, Household income, Semi-urban, Urban	[57] United Kingdom	2,681	Cross-sectional study	Participation rate of CRC screening, Perceived and Inner voice, Area level related uptake FIT test
Gender, Age groups, Education Level, Semi-urban, Urban	[65] United Kingdom	1,969	Cross-sectional study	Participation rate of CRC screening, Benefit and Awareness of P-CRC screening. Lifestyle changes
Gender, Marital status, Age groups, Household income, Semi-urban, Urban, Car ownership, Education Level, Housing tenured Occupation level, , Time as resident and improve housing	[66] United Kingdom	50	Cross-sectional study	Participation rate of CRC screening, Benefit and Awareness of P-CRC screening. Promotion of uptake FIT test for equal of socio-economic inequalities in cancer mortality. A multitude of psychological factors and lived experiences.
Access to Health Gender, Marital status, Age groups, Occupation level, Education Level, health insurance, physicians discussed, Familiar history of colorectal cancer	[67] France	1,856	Cross-sectional study	Participation rate of CRC screening, Promotion by GP, increase public awareness about the benefit of cancer screening

Table2 Risk factors of the relationship of inequalities with P-CRC screening

Continued.

Risk fa			
Socio-demographic variables ***Non-Modifiable Risk factors***			
Aged groups	[63]	<50 ≥50	<0.001
Gender	[63]	Female Male	0.05
Family history of cancer	[63]	No Yes Unknown	<0.001
Race and Ethnicity	[68, 69]	Latinos Non-Latin whites Asians American Black African Pacific Islanders Other race and Ethnicity	<0.05
Economic variables ***Modifiable Risk factors***			
Marital status	[64]	Marital Single, widows, divorce	<0.001
Education level	[67]	Alone In couple	0.070
Household income	[63]	No or Primary education Secondary education or higher	0.578
	[66]	≤ High school >High school	0.984
Geographies	[63]	Lowest Middle Highest	0.372
	[63]	Semi-urban area Urban area	0.001

Risk factors	Author	Exposure	P-value
Modifiable Risk factors			
Economic variables/ Cont.			
Occupation level	[63]		Farmer Manager Employees Self-employees Manual worker Professional Other
Car ownership			
House owner	[66]		Yes No
Time as resident	[66]		Own Renting Other Private accommodation
Improve housing			
Access to health	[66]		<5 Years 6-15 16-30 >30
Health status			
Health Insurances			
Physical discussion	[67]		Refurbishment, Rehousing, Relocation, Installation of Central Heating and Insulation
	[67]		Fair/poor good Excellent /very good
	[67]		Yes No
	-		Yes No

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