Factors Affecting Housing Adequacy and Accessibility in Harar City, Harari Regional State, Ethiopia

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Abstract: Adequate and accessible housings are among the essential features of housing components. In most cities of developing countries, considerable emphasis was placed on the construction of housing units that does not fully consider adequacy and accessibility. This study examined factors affecting housing adequacy and accessibility in Harar city using descriptive and explanatory research designs. The theoretical bases of this study are theory of housing adjustment and the right to the city. A total sample of 275 respondents were randomly selected from six condominium housing sites. Data were analysed using descriptive statistics, ANOVA, and binary logistic regression model. The mean adequacy score obtained from all of the housing attributes revealed that there is inadequate housing. The most important housing attributes with significant influence on residents' perception of housing adequacy are services, facilities, and quality management. However, there is no variation in perception based on respondents' sex, age, marital status, family size, education level, and monthly income difference. The housing sites were not accessible to adequate and qualified schools, transport terminals, health centres, and market centres. Majority of the respondents which comprised 72% and 71.3% believed that the housing sites are inadequate and inaccessible, respectively. A decrease in the accessibility of housing sites is associated with decreasing number and quality of infrastructural and social services. In conclusion, this study provided a holistic picture of housing adequacy and accessibility, and associated factors. It can aid policy makers to revisit and implement a housing policy that consider adequacy and accessibility to upsurge residents' satisfaction.

Keywords: Accessibility; Adequacy; Housing; Housing adjustment theory; The right to the city

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1. Introduction

With low level of urbanization, rapid rate of urbanization in most of the developing countries brought about increasing demand for physical and social infrastructures. Many cities of these countries are struggling to create sustainable cities, which are engines of development to generate jobs, attract investment, and inject development atmosphere to the hinterlands. However, majority of the urban areas of developing countries faced challenges in fulfilling basic infrastructures, creating employment opportunities, providing housing, ensuring proper waste collection and disposal services. Studies firmly indicated that housing is one of the most important components of urban infrastructure. In such manner, Ibem and Amole (2010) stated that inadequate housing condition has become an intractable challenge that has continued to grab the attention of governments, professionals, developers and individuals in most developing countries.

Undeniably, housing is the leading component of urbanization. It is more numerous, more extensive, and represents more investment than any other single use. Besides, housing is fundamental to the health and wellbeing of families and communities. For this reason, access to adequate and affordable housing is critical in any society. Various studies confirmed the role of housing for human being and countries development. Jiboye (2011) considered housing as permanent structures for human habitation. Housing becomes a critical component in the social, economic and health fabric of every nation (Jiboye, 2011; Watcher, Hoek, & Hwan, 2018; Okeyinka, 2014). It is the anchoring component in the construction and expansion of cities and the main driver that catalyses sustainable and resilient territorial development through land-use, infrastructure and transport sectors (Watcher *et al*., 2018). Okeyinka (2014) claimed that housing ownership conferred exchange value, opportunities to raise cash through rental of a house, nexus for family, and base for urban accumulation for present and future generations.

The concept of adequate housing or housing adequacy has been defined and interpreted in different ways by scholars and authors. Eggers and Moumen (2013) described housing adequacy as a situation where there is absence of any form of physical, spatial, and service abnormalities within the dwelling unit and its immediate surroundings. According to Ibem and Alagbe (2015), adequate housing simply means the residential environment that is both quantitatively and qualitatively sufficient in meeting users' needs, expectations and aspirations. Ibem, Aduwo, and Uwakonye (2012) explained that the objective assessment of housing adequacy involves examination of the presence or absence of social infrastructure, housing services and management practices, and the physical and spatial characteristics of housing units. Housing deficiencies would not only be solved by expanding the quantity but it should embrace housing adequacy and accessibility (UN-Committee on Economics and Cultural Rights, 1992). These incorporate moderateness, openness, tenable rooms, legitimate residency security and accessibility of services, offices and infrastructure (Atati, 2014; Omwenga, 2013; Hakijamii, 2012). However, the UN-HABITAT (2006) noted that what constitutes adequate housing varies from one country to another and depends on specific cultural, social, environmental and

economic context. This implies that adequate housing is a multi-dimensional concept determined by contextual factors. Hence, housing conditions considered to be adequate in one context may not necessarily be regarded as adequate housing in another context.

The UN assessed that more than one billion individuals live in inadequate housing, in spots which need access to essential services (transportation, power, water, sanitation), urban administrations (instruction, wellbeing) and open (space for parks and network offices, for example, schools, social insurance focuses) with negative ramifications for human development (UNDP, 2014). The impacts of inadequate housing were widely documented in the literature. Undesirable housing, issues with nourishment and water wellbeing, clogged traffic, air contamination and crime are basic issues of unintended city and urban blast. Urban communities without sufficient and proper management will find it progressively hard to provide reasonable land, decent housing, satisfactory transportation and public services (WHO/UNHABITAT, 2010). Adequate housing must consider the arrangement of available streets, network administrations and recreational areas. Watcher *et al*. (2018) expressed that the area of housing in respect to business and other administration focuses has an immediate ramification for transport and versatility. Hence, the siting and plan of houses influence their defencelessness to catastrophic events.

The two theoretical bases of this study are the '*theory of Housing Adjustment'* and *the right to the city*. The theory of Housing Adjustment by Morris and Winter (1975) is one of the chief theories that explain housing adequacy. As discussed in Ibem, Adeboye, and Alagbe (2015), households assess their housing conditions as a complex process influenced by social context, dwelling units', and neighbourhood characteristics. This theory has identified two criteria used by the households to judge their housing conditions; family norms and cultural norms. The family norms describe the values (i.e. social, economic and psychological importance) families attach on their housing condition. Housing related cultural norms are expressed in terms of housing characteristics; housing space; tenure type; quality; and neighbourhood norms. The conclusion drawn from this theory was that when a household's housing condition does not fit with both the family and cultural norms, housing deficit is said to exist. Housing deficit can manifest in the forms of housing inadequacies and dissatisfaction, and may lead to housing adjustment behaviours such as residential mobility; residential adaptation or family adaptation (Morris and Winter, 1975). The key implication of this theory is that housing adequacy and residential satisfaction are simply the assessment of the extent to which households are experiencing deficiencies in housing quality standards and their inability to derive full benefits and values expected from their present housing condition.

Similarly, over the past decade, '*the right to the city'* has become one of the topical concept in urban studies (Purcell, 2002; Mitchell, 2003; Dikec, 2007; Leavitt, Samara, & Brady, 2009; Marcuse, 2009; Harvey, 2008; Attoh, 2011; Mayer, 2012). According to Harvey (2008) the right to the city is a collective rather than an individual right since changing the city inevitably depends upon the exercise of a collective power over the processes of urbanization. Purcell (2002) stated that the

goal of the right to the city is to encourage urban policies that promote justice, sustainability, and inclusion in cities. It is, therefore, far more than a right of individual access to the resources that the city embodies: it is a right to change inhabitants by changing the city more. Studies claimed that the right to the city should be considered as a new paradigm for urban development that seeks to address the major challenges in cities and human settlements of rapid urbanization, poverty reduction, social exclusion, and environmental risk that call for decisive actions and new policy priorities by national, regional, and local governments (HABITAT III, 2017). The three pillars in this paradigm, according to the same source, include (1) land for housing and livelihoods, and the decommodification of urban space; urban commons, public space, and biodiversity; access to basic services and infrastructure, and controlling pollution; unplanned and informal settlements habitation; resilience, climate change, disaster and risk management; (2) inclusive governance; inclusive urban planning; citizenship; enabling participation, transparency, and democratization; (3) recognition of social actors including gender for migration and refugees; embracing identity, cultural practice, diversity, and heritage; safer cities, livelihoods, well-being, and welfare; poverty risk and employment, inclusive economy and solidarity economy. Similar to the right to the city, the Universal Declaration of Human Rights of 1948 perceives the privilege to adequate housing as a vital part of the privilege to sufficient way of life. Satisfactory housing can be characterized as housing with worthy living space, protection, wellbeing, lighting and ventilation, security of residency, free from natural dangers, essential and social foundation and administrations (UDHR).

Despite these theoretical grounds, in most cities of developing countries, public housing programmes have been criticised for failing to provide quality, affordable and adequate housing units to target population (Mukhija, 2004). Yet, several research studies (Yeun *et al*., 2006; Sengupta and Tipple, 2007; Akinmoladun and Oluwoye, 2007; Ademiluyi and Raji, 2008; Sengupta and Sharma, 2008; Obeng-Odoom, 2009; Fernandez-Maldonado and Bredenoord, 2010; Mohit, Ibrahim, and Rashid 2010) indicate that governments in developing countries are not relenting in their efforts at addressing the problem of providing adequate, affordable and sustainable housing. Similarly, Ethiopia's housing sector is facing formidable challenges due to the absence of strong policy, poor infrastructural development, weak integration among urban sectors, low level of economic growth, income inequality, and over urbanization in some urban settlements. The national government attempted to launch various schemes of housing development program which made substantial number of the inhabitant homeowner. One of the schemes was the construction of condominium housing. The effort to build low-cost condominium houses that are affordable for low-income residents through the government's large-scale Integrated Housing Development Program is an experience that deserves close examination. In this regard, while the construction of the condominium houses was at a marginal cost, it seems that many low-income urban residents cannot afford to own these houses (MoUDHC, 2014). This program does not consider the adequaucy and accessibility of the housing units and sites. What is

least disputable, however, is that there is slight improvement in the quantity of the social and physical infrastructural developments including the housing sector (Kitila, 2019).

Many scholars wrote about housing shortage both in developed and developing countries (Fisher, 2002; Odongo, 1979, Harry, Clench, and Harris, 2014). Similar to the cities of other developing countries, shortage of adequate housing is a serious problem in the major cities of Ethiopia. The previous studies focused mainly on the existing housing demand and supply (Abelti, Marco, and Behailu, 2001; UN-HABITAT 2010; Tamiru 2011; Solomon, 2014; Bihon, 2015; Nuredin, 2015; DBE, 2017). Little efforts were made to examine housing adequacy without looking into the attributes of housing adequacy and accessibility. It can be said that enough work has not been done recently to examine determinants of housing adequacy and accessibility in Ethiopia. In view of these realities, therefore, this study is aimed at filling this knowledge gap and provide theoretical basis to deal with issues of housing adequacy and accessibility for policy makers. As cited in Ibem and Alagbe (2015), Leung and Yu (2012) made it clear that the evaluation of residential facilities can help to improve the knowledge base of managers in identifying the key components of such facilities that influence residents' satisfaction. Generally, the aim of this paper is twofold: First, to explain the factors affecting housing adequacy in Harar city. To this end, the researcher adopted indicators of housing adequacy such as income ratio, facilities and services, safety and comfort, quality management and others as indicated in Esruq-Labin, Che-Ani, Tawil, Nawi, and Othuman, (2014). Second, to identify factors affecting the accessibility of housing sites based on the proximity of the housing sites to infrastructural and social services.

2. Research Methods

2.1. Description of the Study Area

Harar is the capital of Harari People National Regional State and is situated at the confluence of highlands and lowlands of eastern Ethiopia. It is 525kms away from the capital, Addis Ababa. The astronomical location of the city is 9^0 17' 0"N latitude and 42^0 12' 0"E longitude. The city is divided into two parts, the old and the new. The old part is popularly known as 'The walled city' or the natives have named it as 'Jugol'. Jugol means the wall that encircles the old historical traditional houses, sacred graves, relics, holly shrines and mosques. During their occupation (1928-1933), the Italians established the new part of the city, which is considered modern part. These two parts of the city are quite different in various aspects such as the ethnic group, typology of houses, religion and life style (Ayub, 2005). According to the population estimates made by the CSA in July 2016, the region had an estimated total population of about 240,000 from which males and females constituted 121,000 and 119,000, respectively. The rural population in the same period constituted about 44.5% while the urban population comprised of 53.5% (Development Bank of Ethiopia, 2017). According to the CSA report, the urban growth rate of the city was 2.06 percent per year. The ethnic groups in the region include the Oromo (56.41%), Amhara (22.77%), Harari (8.65%), Gurage (4.34%), Somali (3.87%), Tigraway

(1.53%), Argoba (1.26%) and others (1.17%). The religions with the most believers in the region during the same period were Islam (69.99%), Ethiopian Orthodox (27.1%), Protestant (3.4 %), Catholic (0.3%) and others (0.2 %) (CSA, 2016).

2.2. General Data on the Condominium Housing Sites in Harar City

In dealing with housing, there are many types of housing including public/government housing, cooperative housing, self-help housing, private housing, condominium housing, and low-cost housing. The government has endeavoured to formulate and implement various housing policies and programs in different times. One of these policies was the construction of condominium housing; building of the low-cost condominium houses that are affordable by low-income residents through the government's large-scale Integrated Housing Development Program. In Ethiopia, the condominium blocks are ranging from ‘ground floor plus two storeys in height, in some cases ground plus seven storeys. There are four unit typologies incorporated into each condominium block: a studio, 1-bedroom, 2-bedroom, and 3-bedroom unit types. Each unit includes a bathroom, which includes a shower, flush-toilet, and basin, and a separate kitchen (UN-HABITAT, 2010). According to Harari Regional State Housing Agency (HRSHA, 2018) report, a total of 2226 housing units composed of ground floor plus two storeys to ‘ground floor plus four storeys were constructed in 14 sites of the city between 2007 and 2008 (Table 1). The greatest share is for housing units with 2-bed rooms and 1-bed room followed by 3-bed rooms. However, the results of this study foretold that the construction project did not consider adequacy and accessibility issues.

Table 1. The number and types of houses in all sites of Harar city

Site Name	Studio	1-bed room	2-bed rooms	3-bed rooms	Business	Total
2007 project year						
Deker	10	65	68	16	15	174
Kebele 16	3	18	12	3	5	41
Nursing	20	42	56	30	12	160
TTI	0	57	38	0	5	100
Keladamba/Kebele 11	8	106	84	15	15	228
Ras Mekonnen	6	14	30	18	0	68
Kebele 17	4	19	12	4	0	39
Tena Biro	2	18	12	0	13	45
SOS/NOC	16	94	64	18	6	198
Aboker	8	18	8	10	6	50
Total	77	451	384	114	77	1103
2008 project year						
Sau Seid Ali	0	51	153	30	9	243
Aboker	4	21	32	5	3	65
Kebele 17	3	12	16	4	0	35
Gelmeshira	40	107	351	55	9	562
Feresegna	56	21	35	21	0	133
Kebele 11	0	18	42	0	0	60
SOS/NOC	0	15	10	0	0	25
Total	103	245	639	21	21	1123

Source: HRSHA, 2018

The construction of 118 housing units is currently undertaking by the agency. Specifically, 12 H-1 Quadra , 60 H-3 Quadra with terrace, and 46 H-1 duplex units by allocating large amount of budget in two rounds. Table 2 showed the total number of people registered and awaiting for the 3rd round housing provision. Finally, the agency planned to construct 50 houses in the 4th round and 42 individuals were registered. According to the report, these projects were designed to address the housing demand of the middle and high-income group of the community. The implication inferred from these report and projects is that the government must focus and reconsider the needy low-income groups. Equally important is to consider housing adequacy and accessibility to increase the resident's satisfaction.

Table 2. Housing type and houses to construct in the 3rd round (with and without finishing)

	Housing type	Registered (without finishing)	Number of houses to be constructed (without finishing)	Registered (with finishing)	Number of houses to be constructed (with finishing)
1	H-1 Quadra	14	0	1	0
2	H-3 with terrace	85	85	11	14
3	H-1 Duplex	86	86	4	6
4	Total	185	171	16	20

Source: HRSHA, 2018

2.3. Research Design, Sample Size, and Sampling Procedure

The study employed both descriptive and explanatory research designs. Specifically, it used a cross-sectional survey design to collect data from the household heads of six housing sites. According to HRSHA (2018) report, there are about thirteen condominium housing sites in Harar constructed between 2007 and 2008. Out of these sites, this study purposively selected six sites namely Deker, Filla, Gelmeshira, SOS/NOC, Nursing, and Keladamba/Kebele 11 based on the premises that they are located at the outskirt of the city. Again, it can be anticipated that their position would make them inaccessible to infrastructural services. The targeted population were the condominium housing residents of Harar city, which represents 1650 household heads for the selected sites (see Table 1). Respondents were selected randomly from each site using a proportional random sampling technique. Accordingly, the study selected 275 sample respondents from six housing sites in the city (Table 3). The Slovin's formula (Slovin, 1960) was adopted to determine sample size at 95% of confidence level and 5% of precision level.

$$n = \frac{N}{1+N(e)^2} \qquad n = \frac{1650}{1+1650(.05)^2} \qquad n = \frac{1650}{1+5} = 275$$

Table 3. Target population and sample size

Site's name	Total population (Household heads)	Sample size
Deker	174	29
Nursing	160	27
SOS/NOC	223	37
Gelmeshira	562	94
Fila	243	40
Keladamba/Kebele 11	288	48
Total	1650	275

Source: Field survey, 2018

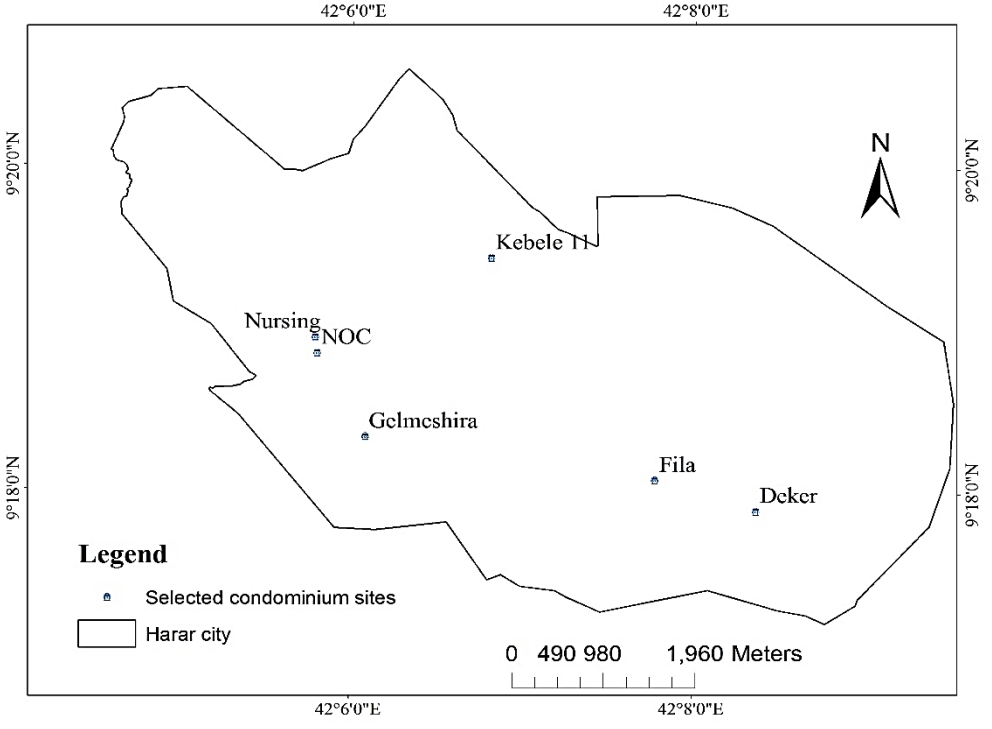

Figure 1: Map of Harar city and selected condominium sites
Source: Ethiopia Mapping Agency, 2019

2.4. Data Sources and Data Collection Methods

Both primary and secondary data were used in this study. The primary data were collected through a household survey, in-depth interviews, and observation; and the secondary data were gathered mainly from published sources. Questionnaire was the main data collection instrument for this study. Structured questionnaire was prepared and distributed to the respondents to solicit information on the determinants of housing adequacy and accessibility. Besides, the study employed interview guide and direct observation to acquire qualitative data related to infrastructural services. The

field work was conducted between February 2018 and December 2018 through personal visits to each of the housing sites.

A questionnaire consisted of 15 housing attributes (7 housing facilities and services, 5 housing quality management, 2 housing safety and comfort, and 1 housing affordability) was used to capture the respondents' perception of adequacy of their residential area. The respondents were asked to rate the level of adequacy of each of the 15 housing attributes based on a five-point Likert type scale, ranging from 1 for "Strongly disagree" to 5 for "Strongly agree". To ensure validity and reliability of findings of the study, the questionnaire used to gather data for the study was pre-tested by selecting 25 household heads. Cronbach alpha coefficient test was also conducted. The test result showed Cronbach's alpha values of 0.76 for all attributes of housing adequacy andaccessibility. Comparatively, these values are more than 0.7 of Cronbach's alpha values recommended by Pallant (2011) implying that the scale of measurement used in the questionnaire instrument was reasonably reliable in assessing the issue.

2.5. Data Analysis Methods

Data were fed into computer and analysed with the help of Statistical Package for the Social Sciences, which recently stands for Statistical Product and Service Solutions (SPSS) IBM 21. Then, the analysis was conducted in two ways. The first was descriptive statistics which produced proportions and percentages of the demographic characteristics of the respondents as well as mean adequacy scores (MASs) for the 15 housing attributes assessed. The MAS represents the average adequacy score given by all the 275 respondents on each of the 15 attributes used in the assessment of housing adequacy. The second type of analysis was determining the housing adequacy and accessibility by running binary logistic regression model based on explanatory variables such as the number, quality, and distance of physical and social services (schools, health centres, shops, markets, transport services). To obtain a valid result, all of the assumptions were checked. Thus, the obtained value of VIF<5 indicated that there is no multicollinearity problem.

2.6. Variables and Model Specification

The dependent variables are housing adequacy and accessibility. To determine housing adequacy, explanatory variables such as the socio-economic backgrounds of the respondents, housing affordability, services and facilities, quality management, and safety and comfort were used. Similarly, the study measured accessibility of the housing sites based on explanatory variables such as the number, quality and distance of basic infrastructural and social services.

The two most popular functional forms of modelling used are probit, which assumes an underlying normal distribution and logit, which corresponds to a logarithmic distribution function. These models have got desirable statistical properties as the probabilities are bounded between 0 and 1. Thus, binary logistic regression model was used to determine the adequacy and accessibility of housing in the study area. With regards to the housing adequacy, the model was used to see if

the perception of housing adequacy is influenced by the respondent's socio-economic backgrounds. Similarly, it was used to regress the dependent variable, Y, of whether the housing site is accessible: the value is 1 if the housing site is accessible and 0 otherwise. Parameters in logistic regression model were estimated using the maximum likelihood method. The statistical significance of each coefficient was evaluated using the Wald test. The enumerated regression coefficients represent the change in the logit of the probability from a unit change in the associated predictor, assuming other factors are constant.

The adopted model assumed the following statistical formula to determine housing accessibility:

$Y= \beta_0+\beta_{1x1}+ \beta_{2x2}+ \beta_{3x3}+ \beta_{4x4}+ \beta_{5x5}+ \beta_{6x6}+ \beta_{7x7}+ \beta_{8x8}+ \beta_{9x9}+ \beta_{10x10} + ui$

Y= the probability of the residents agrees that the site is accessible (measured on a dichotomous scale)

X_1 = Maximum distance to transport terminals (Measured in Meters=continuous)

X_2 = Number of health services (0= low; 5= high)

X_3 = Quality of health services (1=low quality; 5=high quality)

X_4 = Number of early childcare services (0= low; 5= high)

X_5 = Quality of early childcare services (1=low quality; 5=high quality)

X_6 = Number of primary and secondary schools (0= low; 5= high)

X_7 = Maximum distance to the schools (Measured in Meters=continuous)

X_8 = Number of shops (0= low; 5= high)

X_9 = Maximum distance to shops (Measured in Meters=continuous)

X_{10} = Maximum distance to the market (Measured in Meters=continuous)

Likewise, the following statistical formulae were adapted to measure respondents' perception of housing adequacy:

$Y= \beta_0+\beta_{1x1}+ \beta_{2x2}+ \beta_{3x3}+ \beta_{4x4}+ \beta_{5x5}+ \beta_{6x6}$

Y= The probability of the residents agrees that there is adequate housing (measured on a dichotomous scale).

X_1 = Sex (Categorical 0= Male and 1= Female)

X_2 = Age (Continuous)

X_3 = Marital status (Categorical 0 = Single, 1 = Married, 2= Widowed, and 3= Divorced)

X_4 = Education level (Categorical 0= Primary school; 5= PhD)

X_5 = Monthly income (Continuous)

X_6 = Family size (Continuous)

3. Results and Discussions

3.1. Respondents' Background Information

The study wanted to establish background characteristics of the respondents in the premises that they could determine the affordability, accessibility, quality and adequacy of housing. Thus, it examines the sex, age, occupation, education level, marital status, and monthly income characteristics of the respondents (see Table 4). The result shows that the study involved a greater number of female i.e. 158 representing 57.5% and 117 males representing 42.5%.

Table 4. Summary of respondents' background characteristics

Variables	Characteristics/respondents	Frequency	Percentage
Sex	Male	117	42.5
	Female	158	57.5
Age	20-30	119	43.3
	31-40	140	50.9
	41-50	16	5.8
Occupation	Private business	117	42.5
	Government employee	89	32.4
	NGO employee	21	7.6
	Student	15	5.5
	House wife/no job	33	12
Education level	Elementary school (grade 1-8)	67	24.4
	Secondary school (grade 9-12)	34	12.4
	Certificate	43	15.6
	Diploma	51	18.5
	B.A./B.Sc. degree	65	23.6
	Master's degree and above	15	5.5
Marital status	Single	49	17.8
	Married	201	73.1
	Divorced	10	3.6
	Widowed	15	5.5

Source: Field survey, 2018

The age distribution of the respondents ranges between 20 and 40 years, which represents 94%. The mean value is 31 years. Regarding the occupation type, majority of the respondents come under private business (117=42.5%) and government employees (89=32.4%). The educational level of the respondents showed that about 24.4% and 23.6% of the respondents have attended some elementary school and obtained their first degree, respectively. This implies that the study fortunately selects educated respondents and it was helping to obtain quality data. With respect to the marital status, about 201 of the respondents representing 73% were married with low number of widowed and divorced. The monthly income of the respondents is found to be at varying amount and ranging from 2500 ETB to 18,000 ETB. The mean value is about 4800 ETB. Three years is the mean value of respondent's period of residence. Finally, the respondents have a family size of varying number and the mean value is 3.

3.2. Factors Affecting Housing Adequacy

3.2.1. Perception of housing adequacy by the respondents

From the literature, it would seem right to conclude that housing occupants evaluate adequacy of residential environment based on their perception of the extent to which their current housing situations are adequate in meeting their needs, expectations and

aspirations Ibem and Alagbe (2015). The housing attributes such as the income ratio with one attribute, services and facilities with seven attributes, safety and comfort with two attributes, quality management with five attributes.

Table 5. Respondents' perception of housing adequacy

Housing **a**dequacy **a**ttributes	Mean	Std. deviation
The condominium housing prices are affordable.	1.2873	1.15939
The housing is highly accessible to employment	.7491	1.16156
The housing is accessible to public transport services	1.0036	1.50060
The housing is accessible to good quality of education(schools)	1.1491	1.47347
The housing is accessible to shopping facilities	2.0909	1.46582
The housing is accessible to health services	.7127	1.17812
The housing is accessible to early childcare services	1.0218	1.47963
The housing is accessible to open green public spaces	.0655	.38599
The incidence of crime is almost absent	1.3455	1.38314
The environmental problems are low	1.8909	1.41515
The housing is of high quality and up-to the standards	1.4655	1.54545
The housing is with adequate lightings	3.1418	.99537
The housing has adequate and frequent water services	.3018	.58556
The housing has adequate rooms such as kitchens, toilets, bathrooms, and bed rooms.	1.2618	1.41827
There is proper waste management and disposal service	.8255	1.23161
Mean Adequacy Score (MAS) = 1.22		
N=275		

Source: Field survey, 2018

Result of the respondents' perception of adequacy levels of their housing environment shows overall Mean Adequacy Scores (MAS) of 1.22 (Table 5). This suggests that the respondents rated their residential environment in all the six condominium housing sites investigated as inadequate in meeting their needs. The implication of this is that the housing environment is not found at the level of residents' needs, expectations and aspirations. This result is chimed with previous studies that respondents' perception on the adequacy level of housing provided in the study area is inadequate (Ibem *et al.*, 2015; Ibem and Amole, 2010).

3.2.2. Income ratio, services, and facilities

House prices to earnings ratio is one of the criteria used to measure affordability of housing. Housing is said to be reasonable on the off chance that it does not influence the capacity of the family unit to pay for other fundamental consumption. According to Yang and Shen (2008), affordable housing is a component of housing unit which is identified with client capacity and the longing to possess or purchase houses. In addition to this, affordable housing reflects spending to buy a house, which is a

decision made by a family among housing and non-housing related spending (Tawil, Yusoff, CheAni, Abdullah, and Surat, 2012). Moyo (2004) also affirmed that the realities of poverty in developing countries may require a refocus of what the poor can afford, and housing strategies may have to reflect on this unfortunate reality.

Studies indicated that the generation of income is influenced by factors such as the type of job, wage level, educational level, type of business, personal behaviour, and level of expenditure Affordability is controlled by how much a family acquires; the extent of pay the family is ready to or ready to focus on housing and the month to month cost of housing, the lease for inhabitant involved houses or month to month advance reimbursement for proprietor occupier (Eggers and Moumen, 2013). Affordability is also measured by researching cost of housing and area effectiveness by estimating transportation costs identified with the spot (Esruq-Labin *et al.,* 2014). As shown in the Table 6, the lowest mean value suggested that the respondents replied that the housing price (to rent and/or buy) is unaffordable. The binary logistic regression model revealed majority of the respondents (57.1%) believed that the house price is unaffordable.

The implication from this result is that the households are allocating huge cost for housing to rent or buy houses. The data obtained through in-depth interviews showed that the households pay between 40% and 50% of the income on housing. This situation forced some of the households to seek for low-cost rental housing. With an inflated housing prices, it would be impossible for the household head to afford for quality of school, medical services, improved hygiene and sanitation, and balanced diet. Broadly, the effect of unaffordable housing is not confined to the household members but it goes to the extent of affecting the economic performance of the country by creating income disparities between the rich and the poor. In this regard, studies affirmed that the decrease in affordability not only affects households, but it brought polarization of cities by affecting the social cohesion, workforce market productivity, economic performance, along with environmental concerns (Esruq-Labin *et al.*, 2014). For example, one of the interview excerpts consolidated this reality.

> There is social segregation by which high income groups and government officials have access to water and other services. The lower income groups have been deprived of such services. We have frequently observed security problem (some individuals have attempted to break and commit theft and occupied housing units, which are not their own). The housing price is not affordable and is aggravated by high living cost (more than 20 residents have left their home searching for low cost housing units (YY1 respondent, Gelmeshira condominium).

Table 6. Attributes of housing adequacy: Income ratio (IR), services and facilities (SF)

Question items								
IR_1	The housing prices are affordable							
SF_1	The housing is accessible to employment							
SF_2	The housing is accessible to public transport services							
SF_3	The housing is accessible to good quality of education (schools)							
SF_4	The housing is accessible to shopping facilities							
SF_5	The housing is accessible to health services							
SF_6	The housing is accessible to early childcare services							
SF_7	The housing is accessible to open green public spaces							
	Results							
Responses	IR_1	SF_1	SF_2	SF_3	SF_4	SF_5	SF_6	SF_7
Strongly disagree	35.3	64.4	63.6	53.5	25.8	69.5	63.3	96.4
Disagree	22.2	14.9	9.1	17.1	12.4	8	6.5	2.2
Undecided	21.1	2.2	2.2	0	1.8	4.4	4.4	0
Agree	21.5	18.5	13.5	20	46.9	18.2	16.4	1.5
Strongly agree	0	0	11.6	9.5	13.1	0	9.5	0
$\bar{x}$	1.3	0.75	1.0	1.1	2.0	0.7	1.0	0.06

Source: Field survey, 2018

As documented by Watcher *et al*. (2018), availability of affordable housing with access to transport, jobs, and necessary public services for health and safety is a prerequisite for inclusive and diverse cities. The attributes of housing adequacy in terms of facilities and services include access to employment opportunities, public transport services, quality education (i.e., schools), shopping facilities, health services, early childcare services, leisure facilities, and open green public spaces (Esruq-Labin *et al*., 2014; Gallent and Robinson, 2011).

In this regard, the result revealed that the housing sites are not adequate in terms of facilities and services such as employment opportunity (as reported by 79% of the respondents), transportation services (73%), good quality education (71%), early childcare services (70%), health services (78%), and green and public spaces (99%). The mean values are lower than the median value and this implies the housing sites are not adequate as perceived by the respondents. However, respondents comprised 60% agreed that the housing unit is accessible to shopping facilities. In addition to this, the logistic regression model output showed that about 74.9% of the respondents believed that the sites lack good services and facilities (P =. 000). Interview results also indicated that there are no green and public spaces for services like recreation, entertainment, and social interaction. The implication drawn from this result is that the residents hardly get access to good medical and transport services, early childcare services, leisure, and good quality of schools in the nearest neighbourhood. As a result, the residents paid additional service and transport costs to access them. Similar to this finding, Ibem and Amole (2010) also found that the housing estates in Nigeria

generally lacked healthcare facilities, reliable portable water supply, good drainage system, functional street lighting, recreational and educational facilities, refuse disposal system, open spaces and green areas as well as shopping facilities.

3.2.3. Safety and comfort, and quality management

Safety and comfort (level of crime and environmental pollution) as well as quality management that include the standard of the house, rooms, lighting, water, waste collection and disposal are among the core attributes of housing adequacy. As indicated in Table 7, respondents comprising 58.6% agreed that there is incidence of crime while 28.7% of the respondents reported no incidence of crime. The environmental problems such as water, noise, and air pollutions are high as reported by 43% of the respondents. The house is not of high quality and up to the standard when perceived in terms of design and utilities as reported by many of the respondents (57%). However, most of the respondents (85%) agreed that there is adequate lighting. On the contrary, almost all of the respondents (98%) reported that there is inadequate water supply. Moreover, the results obtained from the binary logistic regression model revealed that respondents representing 57.1% perceived that the sites are not good in terms of safety and comfort and the result is statistically significant (P = .019). Likewise, the model revealed that 74.9% of the respondents believed that the sites are not good in terms of quality management (P = .000).

Table 7. Attributes of housing adequacy: safety and comfort (SC), and quality management (QM)

Question items							
SC_1	The incidence of crime is almost absent						
SC_2	The environmental problems are low						
QM_1	The house is of high quality and up-to the standards						
QM_2	The house is with adequate lightings						
QM_3	The house has adequate and frequent water services						
QM_4	The house has adequate rooms such as kitchens, toilets, bathrooms, and bed rooms.						
QM_5	There is proper waste management and disposal services						
	Results						
Responses	SC_1	SC_2	QM_1	QM_2	QM_3	QM_4	QM_5
Strongly disagree	42.2	24.7	46.2	2.9	74.2	44.7	57.8
Disagree	16.4	18.2	10.9	6.9	23.6	23.3	22.9
Undecided	12.7	13.8	3.6	5.1	0	0	5.1
Agree	22.2	29.8	28.7	43.3	2.2	25.1	7.3
Strongly agree	6.5	13.5	10.5	41.8	0	6.9	6.9
$\bar{x}$	1.3	1.9	1.4	3.1	0.3	1.2	0.8

Source: Field survey, 2018

The respondents have reported that the quality of the house is poor. As such they complained about the overall designs and standards. Poorly designed rooms, sub-standard facilities and construction materials resulted in recurrent damage of toilet pumps, excessive leakage, and other problems. To the worst, the city is suffering largely from acute shortage of water and poor solid waste management. Shortage of water is caused by the physical, economic, and administrative challenges. Similarly, the waste management sector of the city has no well-designed management and disposal system due to the shortage of man power, budget, and lack of commitment. Solid waste management, which is already an enormous task in Harar, is going to be more complicated with the increase in urbanization, changing lifestyles and increase in consumerism. Financial constraints, institutional weaknesses, improper choice of technology and public apathy towards Municipal Solid Waste (MSW) have made this situation worse (HCAULGDP, 2013). One respondent mentioned those problems as indicated in the following interview result.

> The good thing I observed is that the site is properly fenced. However, the problem is associated with water shortage and poor waste management practices. The waste is not collected early and properly disposed. Although the safety tanker is working properly there is misuse by the people. So far, the housing agency officials came a year ago but not yet addressed our requests properly (XX2 respondent, Fila condominium).

As cited in Omwenga (2013), the main issue going up against solid waste management incorporates poor coordination, low open mindfulness on natural wellbeing, absence of enough work force and proper facilities, and poor handling practices. Giving accumulation, arranging, preparing, reusing and last transfer of waste has turned out to be an extensive challenge for most of urban regions in developing nations (Harry *et al*., 2014). Some have even recommended that the adequacy of Solid Waste Management can fill in as an intermediary pointer for the nature of administration in urban territories (Whiteman, Smith, and Wilson, 2001). The effective provision of these services has primary health benefits and prevents the spread of disease (Harry *et al*., 2014). The data obtained from in-depth interview showed the housing site has been suffering from shortages of infrastructural services as described below.

> The site has no fence and guards. Majority of us are mainly displaced and resettled residents for development and composed mainly from low- and middle-income groups. Our main problem lies with security problems, acute shortage of water and improper waste management practices. To make matters worse, we have gotten no room and opportunity to present all our problems to the higher officials (WW3 respondent, Keladamba condominium).

In addition to the aforementioned methods and discussions, a binary logistic regression model was used to determine whether the housing is adequate and the perception toward housing adequacy vary based on the respondents' socio-economic background. Accordingly, the result revealed that about 198 (72%) of the respondents perceived that there is inadequate housing. However, there was no variation in perception of housing adequacy. As depicted in Table 8, the explanatory variables in the model provided statistically insignificant results at P= <0.05. The implication drawn from this result is that the perception of housing adequacy did not vary based

on respondents' sex, age, education level, marital status, family size, and monthly income.

Table 8. Variation in the perception of housing adequacy

Explanatory variables	B	S.E.	Wald	df	Sig.	Exp(B)
Sex (1)	-.114	.293	.152	1	.696	.892
Age	.294	.237	1.538	1	.215	1.341
Education level			2.973	5	.704	
Education level (1)	-.774	.617	1.576	1	.209	.461
Education level (2)	-.549	.670	.670	1	.413	.578
Education level (3)	-.973	.668	2.122	1	.145	.378
Education level (4)	-.639	.632	1.021	1	.312	.528
Education level (5)	-.421	.606	.482	1	.488	.657
Family size	-.124	.126	.971	1	.325	.883
Marital status			.378	3	.945	
Marital status (1)	-.301	.668	.203	1	.652	.740
Marital status (2)	-.343	.585	.345	1	.557	.709
Marital status (3)	-.202	.929	.047	1	.828	.817
Constant	.249	.968	.066	1	.797	1.283

Source: Field survey, 2018

3.3. Factors Affecting Housing Accessibility

The second objective of this study is to determine housing accessibility based on the data obtained from field visit and the respondents. To this end, a binary logistic regression model was used to determine whether housing accessibility can be predicted based on the distance, number and quality of infrastructural services. Accordingly, the explained variation in the dependent variable based on the model ranges from 61.9% to 88.6%. In other words, between 62% and 89% of the variance in the dependent variable is explained by the model. The omnibus tests of model coefficients show $X^2(10, N=275) = 265.415$, $P < .001$, which is significant value and the Hosmer and Lemeshow test result $X^2 = 1.491$, $P > 0.05$, which are insignificant values are good support of the model. As depicted in Table 9, most of the residents (representing 71.3%) believed that the condominium housings are not accessible and this is mainly based on respondents from Deker (86.2%), Fila(72.5%), SOS (70.3%), and Gelmeshira (70.2%).

Table 9. Accessibility of the housing sites

		Accessibility				Total
		Not accessible		Accessible		
		f	%	f	%	f
Site name	SOS	26	70.3	11	29.7	37
	Fila	29	72.5	11	27.5	40
	Nursing	18	66.7	9	33.3	27
	Deker	25	86.2	4	13.8	29
	Keladamba	32	66.7	16	33.3	48
	Gelmeshira	66	70.2	28	29.8	94
Total		196	71.3	79	28.7	275

Source: Field survey, 2018

The general explanation from the model is that number of health centers, number and quality of early childcare centers, number of shops, distance to shops, and distance to the market added significantly to the model/prediction. But, distance to transport terminals, quality of health services, number of primary and secondary schools, and distance to schools did not add significantly to the model (see Table 10). The explanation from the model is that an increasing in the distance from the transportation terminal is associated with a reduction in the likelihood of accessibility of the housing site (β = -.006, *P* = .190). However, the result is not significant. A decreasing in the number of health services is associated with a reduction in the likelihood of accessibility of the housing site (β = 1.006, *P* = .019). The value is statistically significant. Similarly, decreasing in the quality of health services is associated with a reduction in the likelihood of accessibility of the housing site (β = .466, *P* = .152). The value is statistically insignificant.

Table 10. Determinants of housing accessibility

Variables	B	S.E.	Wald	df	Sig.	Exp(β)
Distance to transport terminals	-.006	.005	1.719	1	.190	.994
Number of health services	1.006	.429	5.500	1	.019	2.734
Quality of health services	.466	.325	2.055	1	.152	1.593
Number of early childcare services	2.839	.624	20.675	1	.000	17.095
Quality of early childcare services	2.865	.730	15.401	1	.000	17.542
Number of primary and secondary schools	.008	.314	.001	1	.981	1.008
Distance from primary and secondary schools	-.438	.333	1.735	1	.188	.645
Number of shops	1.533	.401	14.637	1	.000	4.632
Distance to the shops	-.013	.004	9.170	1	.002	.987
Distance to the market	-.035	.008	19.677	1	.000	.966
Constant	-10.586	2.799	14.305	1	.000	.000

Source: Field survey, 2018

Decreasing in the number and quality of early childcare services is associated with a reduction in the likelihood of accessibility of the housing site (β = 2.839, *P* = .000 and β = 2.865, *P* = .000). The beta value β = .008, *P* =.981 showed decreasing in the number of primary and secondary schools is associated with decreasing in the accessibility of the housing site with insignificant p-value. Increasing in the distance from the school is associated with decreasing in the accessibility of the housing site. B = -.438, *P* = .188. However, the result is not significant. With a significant result in the p value, the decreasing in the number of shops is associated with the reduction in the accessibility of the housing sites (β = 1.533, *P* =.000). Finally, the model predicts an increasing in the distance from the shop (β = -.013, *P* =.002) and market (β = -.035, *P* = .000) is associated with the reduction in the accessibility of the housing sites. The conclusion drawn from these results is that the more far the housing sites are from schools, health services, transport terminals, markets, and offices is the less they become accessible.

Table 11 shows the output of the ANOVA analysis to determine whether there are any statistically significant differences between the means of two or more independent (unrelated) groups. The model tests whether the distance, quality and number of infrastructural services differed based on the residents' housing sites. To run the model, both Levene's test for homogeneity of variances and Shapiro-Wilk test of normality were tested. The result revealed significance values for many of the independent variables such as the distance to transport terminals (*P* = .000), number of health services (*P* =. 000), number of early childcare (*P* = .027), quality of early childcare services (*P* = .000), number of primary and secondary schools (*P* = .000), distance to shops (*P* = .000), and distance to the market (*P* = .004). Therefore, there is a statistically significant difference in the mean distance to transport terminals, number of health centres, number of early childcares, quality of early childcare services, number of schools, distance to shops and markets among SOS, Fila, Keladamba, Deker, Nursing, and Gelmashira condominium housing sites. On the other hand, quality of health services, the distance from schools and number of shops have produced insignificant values, which is $P > 0.05$.

Table 11. Determinants of housing accessibility based on sites

Varibales		df	F	Sig.
Distance to transport terminals	Between groups	5	37.715	.000
	Within groups	269		
Number of health services	Between groups	5	4.973	.000
	Within groups	269		
Quality of health services	Between groups	5	.676	.642
	Within groups	269		
Number of early childcare services	Between groups	5	2.573	.027
	Within groups	269		
Quality of early childcare services	Between groups	5	4.777	.000
	Within groups	269		
Number of primary and secondary schools	Between groups	5	4.761	.000
	Within groups	269		
Distance from primary and secondary schools	Between groups	5	.070	.997
	Within groups	269		
Number of shops	Between groups	5	.981	.429
	Within groups	269		
Distance to the shops	Between groups	5	21.868	.000
	Within groups	269		
Distance to the market	Between groups	5	3.494	.004
	Within groups	269		

Source: Field survey, 2018

As shown in Table 12, the descriptive statistics shows that the mean value for the distance to transport terminal is 237 meters with a standard deviation of 191.314. It was realized that there are about 2 health centers in each housing sites. The quality of health services is a bit below moderate quality with a mean value of 1.80 with a standard deviation of 1.127. There are nearly 3 early childcare services that are with low quality. The mean value for the number of primary and secondary schools is 2.17 with standard deviation of 1.089. Concerning the distance to schools, the value shows almost at midpoint with mean value of 2.70. On average, there are 2 shops in the sites. The mean value of the distance to shops and transport is 269 meter and 296 meters, respectively. Particulary, one of the respondents from Deker site has described the challenges and problems as follows;

> The site is located at far distance from the downtown and so inaccessible. We have faced challenges with transportation, water, health and education services. For example, we are forced to pay extra costs of transportation and sometimes we use taxi contract. The landscape/topography is not plain and there are poor infrastructural developments. We get water twice a month (ZZ4 respondent, Deker condominium).

Table 12. Mean scores of the physical and social services in all housing sites

Variables	Mean	Std. deviation
Distance to transport terminals (in meters)	237.16	191.314
Number of health services (in number)	1.96	1.120
Quality of health services (1=less quality, 5=high quality)	1.80	1.127
Number of early childcare services (in number)	2.77	1.244
Quality of early childcare services (1=less quality, 5=high quality)	2.15	1.033
Number of primary and secondary schools (in number)	2.17	1.089
Distance from primary and secondary schools (1=nearest, 5=furthest)	2.70	1.264
Number of shops (in number)	2.21	1.136
Distance to the shops (in meters)	269.25	192.153
Distance from market (in meters)	296.73	138.515

Source: Field survey, 2018

4. Conclusions and Recommendations

This study assessed factors affecting housing adequacy and accessibility in Harar city, Harari Regional State, Ethiopia. Indicators of housing adequacy such as income ratio, facilities and services, safety and comfort, and quality management were assessed. The proximity of the housing sites to infrastructural and social services were examined to determine accessibility. The mean adequacy score obtained from the analysis of 15 housing attributes clearly revealed that there is inadequate housing. The most important housing attributes with significant influence on the residents' perception of housing adequacy are services and facilities, and quality management. The residents' perception of housing adequacy was not influenced by their sex, age, marital status, family size, education level, and monthly income. The housing sites were not accessible to adequate and quality schools, transport terminals, health centres, and shopping and market centres. In conclusion, this study provided a holistic picture of housing adequacy and accessibility in the city. Thus, a housing development without required infrastrucres and services cannot satisfy the residents. What is more, the findings can help the government and policy makers to revisit housing policy that considers adequacy and accessibly. Based on these conclusions, the following recommendations are made. First, there should be strong need and commitment by the government to ensure the performance of public housing in meeting residents' needs, expectations and aspirations. Second, appropriate policies, regulations, and standards need to be in place to measure the residential housing performance, and enhance the adequacy and accessibility of housing. Finally, the development and management of residential facilities should follow user-focussed and participatory approach, which enables end-users to have a role in the design, planning, development and management of housing facilities.

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