West Africa Built Environment Research (WABER) Conference
10th Anniversary Conference, 5-7 August 2019, Accra, Ghana
Proceedings Edited by Laryea, S. and Essah, E.
ISBN: 978 – 9988 – 2– 6010 – 1
DOI: https://doi.org/10.33796/waberconference2019.65

SIZE AND ADEQUACY OF LIVING SPACE IN THE HOME: AN EVALUATION OF PUBLIC APARTMENTS IN CAPE COAST, GHANA, BASED ON SPACE PER PERSON (SPP)

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The size and adequacy of space in the home affects the quality of life of occupants in many important ways - physically, psychologically, socially and economically. But how much space is adequate, and on what basis may this be established? In view of the limitations of traditional overcrowding measures such as number of bedroom standard and room density, the UN now recommends the use of Space Per Person (SPP). Using the case of six designs in Cape Coast, this study evaluates the size and adequacy of living space in public apartments in Ghana, based on SPP. First, ISO 9836 – 2011 (E) intra-muros method of measurement is used to measure the useful floor areas of the apartment design obtained from the Architectural Engineering Services Limited (AESL). Structured interviews were then conducted with 115 households to obtain information about the household size. The mean dwelling sizes were then divided by the mean household size to obtain the SPP values. Compared with the provisions in the National Building Regulations as well as recommendations in other international standards used for architectural practice in Ghana, the study found that the size of rooms/spaces and the dwelling unit as a whole were generous. However, the SPP values were small due to the large household sizes. The study demonstrated and concluded that SPP is a more useful and robust measure for determining the adequacy of living space. This is because it is sensitive and responsive to the practical need of space for use in the home (that is for living and household activities) in different context against the backdrop of household size as a socio-cultural concept. This makes SPP useful in defining (in theory) and determining (in practice) the actual amount of space needed in the home in different social and cultural contexts.

Keywords: activities, adequacy of space, household size, space per person, space size

INTRODUCTION

Providing adequate, safe and affordable housing for all citizens remains one of the key policy objectives of governments all over the world (UN, 2015; UN-Habitat, n.d). This is evident in Sustainable Development Goal (SDG) 11, which aims for universal access to adequate, safe and affordable housing by 2030. Indicator 11.1.1 of the Sustainable Development Goals (SDGs), for example, considers "sufficient-

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Agyefi-Mensah, S and Kpamma Z. E. (2019) Size and adequacy of living space in the home: an evaluation of public apartments in Cape Coast, Ghana, based on space per person (SPP) In: Laryea, S. and Essah, E. (Eds) Procs West Africa Built Environment Research (WABER) Conference, 5-7 August 2019, Accra, Ghana, 907-920

living area (not overcrowded)" as one of the five housing conditions selected for measuring gains towards the attainment of the human settlement goal. Among the Organisation for Economic Cooperation and Development (OECD) countries, adequate housing is one of the principal dimensions of the framework for measuring wellbeing (OECD, 2015). From the point of view of public health, inadequate housing is considered a public health risk (Novoa et al., 2015; Bashir, 2002).

Adequate housing, however, means more than a roof over one's head (UN Habitat, n.d). In addition to providing security of tenure, the availability of basic service materials and infrastructure (such as indoor toilet, safe drinking, energy for cooking, heating, lighting, food storage or refuse disposal), as well as access to social amenities (such as health-care services, schools, childcare centres and other social facilities), adequate housing also means adequate living space (UN-Habitat, n.d; The Habitat Agenda, paragraph 10, UNCHS, 1997). In many developing countries, however, the adequacy of living space is a cause for concern. According to one UN Habitat (2006) report, the lack of adequate living space is most acute in Africa and South- and South-east Asia. For example, in all Africa, living space per person is less than 20 m2 with 96% being less than 14 m2 (UNPD, 2000)3. In Ghana, successive governments since independence have made efforts through various interventions to provide adequate housing (including adequate living space) (GoG, 2015; MWRWH, 2005; MWH, 1973, 1976, 1987; BRRI, 1972). This notwithstanding, the 2010 Population and Housing Census revealed that 44.5% of all households occupy only one room; 24.8% occupy two rooms with 11.6% occupying three rooms (GSS, 2012). This is against a national population per house of 7.3 and an average household size of 4.4 persons (GSS, 2012).

Although public housing constitutes a relatively small proportion of the supply of housing in Ghana (approximately 5% according to Tipple, 2000), it is of significant research interest because it represents a proven means by which governments provide adequate housing for the citizenry in both developed and developing countries, the world over (Golland, 2019; van Kempen & Bolt, 2019). Yet, several researchers have decried the quality of government-provided housing (Vakalis, 2019), particularly in terms of the size and adequacy of living space, not only in developing countries like Nigeria (Salisu et al., 2019; Ibem & Amole, 2011; Chokor, 2005) and Ghana (Fiadwo et al., 2001; Tipple, 2000) but also in developed countries including UK (Schneider & Till, 2007; Pickard, 2002), Europe (Rowland et al., 2012), and across North America (Sousa and Quarter, 2004). Given the huge impact of the amount of space in the home on the physical, psychological, social, and economic occupants, the adequacy of living space in public apartments becomes an issue that deserves research attention. But how much space is adequate, and on what basis may this be established, given that different cultures the world over conceive and use space in the home differently (Hillier and Hanson, 1984; Hillier, 1996), the general consistent pattern of use notwithstanding?

Among the traditional measures for determining the adequacy of living space are the so-called bedroom standard and room density (Williams, 2009; Fiadwo et al.,

[3] United Nations Population Division (UNDP) on sustainability
https://www.un.org/esa/population/pubsarchive/chart/2.pdf

2001). These are however limited as outcome measures because they are essentially overcrowding measures, which assess the amount of space in the home based on the number of bedrooms in a unit, and not on the actual space available (in square metres) to support living and household activities. In view of this limitation, the United Nations now recommends the use of Space Per Person (SPP) as the basis for determining the adequacy of living space. Using designs for public apartments in Cape Coast, Ghana, this study evaluates the size and adequacy of living space based on space per person (SPP). The goal is to demonstrate the usefulness of SPP as a context-responsive measure of the adequacy of space in the home relative to known traditional measures. The paper is organized as follows: Section 2 reviews literature relevant to the study. This focuses on the necessity of adequate living space in a housing unit in light of the physical, psychological, social and economic wellbeing of occupants. It then highlights the limitations of existing measures for assessing the adequacy of space in the home, and in view of these, present the merits of Space Per Person. Section 3 presents the methodology employed in the study; Section 4 presents the study results and discussion with conclusions in Section 5.

LITERATURE REVIEW

Necessity of adequate space in a housing unit

Evidence from historical review of the evolution of space standards, as well as contemporary research studies, suggests that the amount of space in the home is critical for the general health and wellbeing of occupants, family function and the development of children, productivity, dwelling usability and long-term adaptability, and social inclusiveness of homes (Xie, 2019; Dovie, 2019; Carmona et al., 2010). The amount of space in the home affects occupants' need for privacy and safety, with knock-on physical and psychological effects, the educational attainment of children, family relationships, and the general sense of freedom in the home (Gifford, 2011; RIBA, 2011; Evans, Wells & Moch, 2003; Pennartz, 1986). Work by Cassen and Kingdon (2007) found that the 'home learning environment' has a significant part to play in improving or impairing performance. Some studies show that while larger rooms may produce feelings of expansiveness and freedom, small rooms lead to feelings of confinement and crowding (Sadalla et al., 1978). In a study of housing and the mental health of rural migrants in urban China, Xie (2019) found that living space is significantly associated with the mental health of rural migrants, noting that an increase in living space enhanced the mental health of rural migrants who live in private rental housing tends compared to those who live in dormitories.

Crowding (and overcrowding) is particularly linked with the spread of diseases such as respiratory, ear, eye, skin infestations and infections (Vakalis, 2019; Canfield et al., 2003; Krieger & Higgins, 2002), diseases attributed to unavoidable contact between individuals and families who share, among other things, bedding. A quantitative analysis of health and housing space based on a survey of 505 households in accommodation deemed to be 'overcrowded' revealed the importance of space in providing personal privacy, reducing depression, anxiety and stress, giving children room to play and ensuring a good night's sleep (Shelter, 2004). Reynold (2005) study also found that cramming of different activities (studying, socialising, and relaxing) into limited space may adversely affect family

life, creating a difficult dynamic which may play a part in the breakdown of relationships. On the other hand, adequate space can create opportunities to work at home, increasing productivity. According to Çavusoglu et al (2008), having space to install a desk and computer may allow someone to start a home business or, it may allow an occupant to spend part of the working week at home, improving their life-work balance and working in a more focused way.

For practical usability, the floor and living space is critical to the effectiveness and efficiency with which household activities may be carried out. The amount of space in the home facilitates sensible arrangement of furniture/equipment, storage, while contributing to efficiency in circulation. There is also evidence that for most occupants, dissatisfaction with housing quality is related to the limited amount of space in general, and storage and kitchen space in particular (Swenarton, 2009; BRE, 1993; Oseland & Raw, 1991). In the long term, the amount of space in a dwelling can constrain functionality by restricting flexibility in use, disallowing multiple uses of spaces as residents' requirements change (Schneider and Till, 2007; Slaughter, 2001; Atlas & Ozsoy, 1998). Çavusoglu et al (2008) argue that adequate space in dwellings will allow residents to adapt space to their changing needs over the life course, delivers long-term accessibility and sustainability, and hence future proof homes. The size and adequacy of space is in the home is thus important not only for the physical, psychological, social and economic wellbeing of occupants. It is also critical to the functionality and long-term sustainability of the unit in terms of effectiveness, efficiency and satisfaction with use.

Measures of adequacy of space in a housing unit

One of the common approaches used to determine the adequacy of dwelling space is to compare design provisions with the minimum space standards stipulated in Building Regulations, both national and international. These standards specify the minimum acceptable amount of space necessary to meet the requirement for safety and public health. But minimum standards are only as good as minimum. Heywood (2004) contends that minimum standards should exist only to eradicate bad housing. Thus, while basic functionality underlie the development of minimum standards, they do not necessarily assure the adequacy of space required for proper functioning of occupants.

Apart from minimum space standards, room density is also commonly used for assessing the adequacy of space in dwelling units. This measure is considered as an overcrowding measure, and provides indication of the average number of persons per habitable room modeled after the planning system in the UK. The room density measure is also referred to as the 'bedroom standard' (Williams, 2009). According to Williams, the bedroom standard assumes that the greater the number of rooms, the larger the size of a dwelling unit. This assumption is however flawed because apartments with the same number of rooms, can have considerably different floor areas/space. For example, UK and Belgium have the same average number of rooms per dwelling of 4.7, but floor spaces available in these buildings are estimated to be 87 and 113 square metres respectively (MIIR, 2007), a differences of about 30%. Similarly, the Netherlands, Italy and Sweden have average number of bedrooms per dwelling of 4.2 but the average floor space per dwelling are respectively 98, 96 and 91 square metres (MIIR, 2007). Thus, assesing the the size and adequacy of a dwelling unit based on the number of rooms is

simplistic as it obscures knowledge of the actual amount of space for living in the home.

In light of the limitations of the measures above, the United Nations recommend the use floor area (space) per persons as the measure for assessing the adequacy and hence quality of living space (UN, 2004). Floor area per person is defined as the average useful floor area of a housing unit divided by the average household size. In this definition, the term useful floor area is refer to all the available space in a housing unit for household activities, including all living spaces, along with bathrooms, internal corridors and closets. Covered semi-private spaces such as corridors, inner courtyards or verandas are also included in this calculation if used by the household for cooking, eating, sleeping, or other domestic activities. This is consistent with Rapoport (2005), who argues that a house properly conceived and conceptualized, is a system of settings within which particular activities and systems of activities take place. Accordingly, it is the support spaces provide for activities in a given dwelling unit that should form the basis for determining whether the space is adequate or not. For example, citing the example of the miscalculation of housing density/crowding in the West End of Boston, USA, Rapoport (2005) attributes the error to the conceptualization of a house used. which can greatly change what is considered to be crowded. This is because in the West End of Boston example, "when one considered people's activity systems as occurring within [a] larger system of settings, the dwellings were, in fact, adequate; density was not too high, and there was no overcrowding" (Rapoport, 2005, p. 22).

As a measure, floor area (space) per person is deemed useful not only because it relates the amount of space in a dwelling unit directly to the requirements for household activities. More importantly, it takes into account the size of the household. For policy decision, SPP is considered to be more sensitive (UNCHS, 1996). SPP is therefore now used as one of the key indicator for assessing progress toward sustainable development. In an empirical model of new housing starts based on the theoretical treatment of urban growth, Jayantha and Lau (2008) conclude that SPP is a sustainable human settlement development indicator that reflects the quality of housing. According to Jayantha and Lau, SPP is a highly income-sensitive factor and a change in the household's income may be reflected through changes to the SPP. Thus, as a measure, space (floor area) per person is of practical significance for users, designers, realtors, planners and policy makers. In Ghana, this paper represents one of the foremost empirical studies on the subject, and thus provides an avenue for demonstrating the usefulness of the measure for purposes of design and policy-decision-making.

Space Per Person (SPP) as a measure of adequacy

Space Per Person (SPP) is defined by two main variables: the average useful floor area, and the average size of the household. Floor area constitutes one of the key parameters for assessing the quality of a dwelling (Emmitt & Gorse, 2002). A basic reason for this is that people's judgment of spaciousness is found to be strongly related to their perception of visible floor area (Benedikt & Burnham, 1985). Accordingly, in many countries around the world, the amount of space in a dwelling unit is expressed in terms of the available floor area although differences exist in

what counts or do not count as useful space. In general, the 'useful space' encompasses the total floor area of all functionally connected rooms - bedrooms, dining rooms, and living rooms. In addition to this, some countries include secondary rooms or auxiliary spaces (such as kitchen, entrance hall/hallways corridors, bathroom, toilet, pantry, storage room, built-in cupboards, etc.) considered necessary or suitable for habitation (Dol & Haffner, 2010). But while most countries exclude balconies, terraces, cellars, loggias, lofts, and in multi-storey dwellings, common spaces, others like Spain include balconies while in Portugal, the useful floor area excludes entrance halls, corridors, bathrooms and toilet rooms, cella) and other similar areas (Dol & Haffner, 2010). Thus, apart from spaces for sleeping, living and cooking space, differences exist among countries in terms of whether sanitary facilities, storage space, and ancillary areas as well as circulation and common areas, are included in the calculations. In Ghana, the National Building Regulations makes no provisions regarding which functional spaces count as 'useful' space.

Besides the variations in the functional spaces covered in the estimates, differences also exist in the approach to measurement i.e. how the useful space is measured - whether dimensions are taken from the internal or external face of the finished wall, and hence whether the measured space is the net or gross floor area. ISO 9836 – 2011 (E) recognizes these differences in method and refers to them respectively as the intra-muros (net floor area) and extra-muros (gross floor area) methods of calculation. For example, while most countries in Europe follow the net floor area method, in Greece, estimation of the useful floor area includes the width of the outer/external wall – gross floor area (Dol & Haffner, 2010). In Ghana, the intra-muros method is used. Tipple (1994) describes it as all areas within the external and/or party walls of building used for residential purposes. According to the National Building Regulations, floor areas are measured from the "inner finished surfaces of ...enclosing walls or where there are no enclosing walls the outer edges of the floor." (National Building Regulations, L. I. 1630, Schedule 7, Part II, section 5, 6). This includes all internal and partition walls, as well as balconies and verandas provided that to any storey building they taken within the enclosing walls of the storey.

Broadly, ISO 9836 – 2011 identifies spaces in a building as usable area, service area and circulation spaces. The usable area describes the 'main usable areas' and the 'subsidiary usable areas,' and covers all spaces the functions of which correspond to the purpose of the building. The main usable floor area is used to describe spaces that are primary to the purpose of the building, while subsidiary cover spaces ancillary to this purpose. The service areas accommodate the technical installations which service the building such as pipes for the distribution of water, or disposal sewage. Circulation areas facilitate movement and hence access within and between spaces in the building. In a housing unit, the kitchen and sanitary facilities are referred to as the service core areas (Schneider and Till, 2007).

In view of the foregoing background, the useful floor area can be defined as the total floor area of all functionally connected rooms and spaces in a dwelling unit necessary or suitable for human habitation and/or household activities. As specified by the National Building Regulation, these comprise of all spaces required for sleeping, cooking, eating, and living, sanitary conveniences, and storage plus

circulation areas. The useful floor area thus includes bedrooms, dining rooms, living rooms, kitchen, bathroom, toilet, entrance hall/hallways, balconies, corridors, storerooms, and built-in cupboards, and any such space provided it is used to support household activities.

Household is a socio-cultural concept influenced by the structure and composition of the household. Differences therefore exist in the definition of the term household across countries. For example, while a household does not include a house help and/or guests in some countries, in Greece, "strangers are considered as household members if they have at least one principal meal a day with the family or with the head of the household" (Dol & Haffner, 2010). According to Nukunya (2011) a household describes a group of people who share the same housekeeping and eating arrangements, referring to the people who "eat from the same pot." For the purposes of national population and housing census, the Ghana Statistical Service defines a household in the same way as Nukunya but clarifies this to include house helps (GSS, 2012). A household can thus be defined as a person or group of persons who live together in the same housing unit, and who share the same housing keeping and eating arrangements. The household size refers to the total number of people who constitutes the household obtained at the time of the census or inquiry (UN Habitat, 2007; GSS, 2002, 2012).

METHODOLOGY

The study adopted a quantitative research approach based on a case study research strategy. The cases (unit of observation) consist of the apartments as realized through design and occupied. A case study was used because it helps to establish in-depth and concentrated knowledge about a situation by considering the real physical and social context of the case (Christiaans et al., 2004; Meredith, 1998; Yin, 2003). To represent the spectrum of designs commonly provided as public apartments in Ghana, two designs each for the 1, 2 and 3-bedroom units were selected out of the 10 typical designs identified for public apartments in the study location. These design were location-specific designs that formed part of a total of 53 unique designs that have used for public apartments in Ghana since independence (from 1957 to 2010) collected as part of the data for a PhD study (Agyefi-Mensah, 2013). The characteristics of the design are presented in Table 1. The designs (floor plans) of the apartments were obtained from the archives and architectural records of the Architectural and Engineering Services Limited (AESL), a quasi-government organisation that has been responsible for the design of most public buildings. To confirm the provisions in the design obtained, on-site measures were taken and as-built drawings produced.

To obtain the SPP values for the designs, first, floor areas of all rooms and spaces relevant to the definition used in the study were estimated following the ISO 9836 – 2011 intra-muros method (Table 2). This meant that all areas were measured by their actual dimensions, expressed in square meters to two decimal places, from the finished surface of internal walls. To determine the size of households, interviews were conducted. In all, 115 households out of a total of 184 occupants were interviewed. This represents 62.5 percent of the households under study (Table 1). The data collected were analyzed descriptively using mean scores and standard deviations. The outcome measure - space per person (SPP) for each

design - was then determined by finding the ratio of the floor area to the mean household size.

Table 1 Case study designs and respondents

Unit type	Case study flat	Total no. of Unit	Respondents sampled	Respondents percent
1-bedroom	RCC	42	32	78.5
	Black Star	18	11	61
2-bedroom	GPS	48	18	37.5
	Mfantsipim	24	18	75
3-bedroom	CRH	48	32	66.7
	C-Poly	8	4	50

RESULTS AND DISCUSSION

Table 2 presents the net floor areas of rooms and spaces (in square meters) as measured from the floor plans. These values are compared with the national minimum standard. The Table shows that except in a few cases such as the kitchen (with a mean size of 5.83 m2) and bathroom in the 1-bedroom unit, which is less (2.68 m2), the provisions of the designs far exceed the national minimum standard. Table 2 also shows that the mean net internal floor area of the 1, 2 and 3-bedroom units were 54.9, 87.73 and 138.73 square meters respectively. The mean household sizes of the units according to the household survey were 4, 5.1 and 6.15 in the 1-bedroom, 2-bedroom, and 3-bedroom units respectively (Table 3). This give an overall mean household size of 5.1, which exceeds the national estimate of 4.4 (GSS, 2012). A maximum of 9 and 14 household sizes were however found in the 1B and 3B units respectively. The high household size in the 3B units was due to observed sharing arrangement (by two or three households) in some of the units. Based on the mean NIFA and the mean household size, the estimated SPP for the units are 13.73, 17.32 and 22.51 square meters per person for the 1-bedroom, 2-bedroom and 3-bedroom respectively (Table 3 presented as Appendix A).

The results of the study as presented in Table 2 shows that the size of bedrooms in all the cases evaluated exceed the national minimum standard by as much as 26% to 100%. In other words, the size of bedrooms in the units exceed the national minimum by approximately one-fifth to double. In the case of the living-dining space, except in the 1-bedroom units where the national minimum exceeds the provisions marginally by some 1.6 percent, the provision in the units exceed the national standard by as much as 4 to 92 percent. Similarly, in the case of the kitchen, except the 1-bedroom unit which is lower in size by margins up to 23 percent, the provisions in all the units exceed the national minimum by margins up to 54 percent. In all cases, however, the provision for the combined shower/WC space exceed the minimum standard, albeit only marginally. Overall, the sizes of the spaces can be said to be generous and adequate. This is true when compared to other minimum international standards such as Time Saver Standards in the USA (De Chiara & Crosbie, 2001), Metric Handbook in the UK (Littlefield, 2000) and Ernst and Neufert Architect Data (Neufert et al., 2000) across Europe suggesting that houses built by the government have relatively generous space standards.

Table 2 Type and sizes of spaces provided in the units

Space	Unit Area in m2					
	1 -Bedroom		2 - Bedroom		3-Bedroom	
	RCC	Black Star	GPS	Mfantsipim	CRH	C-Poly
Master bedroom					22.48	22.5
Bedrooms 1	14.06	14.64	14.57	16.2	20.44	15.81
Bedroom 2			14.57	13.5		13.8
Guestroom					14.7	
Living room			16.31		11.48	
Dining room			4.46			
Study						12.6
Living + dining	18.36	19.89		22.14	38.36	
Kitchen	5.67	5.99	7.69	7.29	11.48	10.46
Store room			4.46			11.88
Shower	3.47	1.89	2.03	1.8	3.80	1.82
WC	1.5	1.62	1.58	1.58	1.58	1.69
Washroom lobby		2.21				3.75
Guest WC						1.69
Balcony	5.63	3.15	3.24	9.84	9.57	6.75
Front porch (LR)			5.47	14.85	10.46	
Box room						4.78
Net Internal Floor Area (NIFA)	55.15	54.65	85.02	90.44	144.47	132.4

Nevertheless, in terms of space per person, the units are small and the spaces inadequate. The results show that the mean space per person for the 1-bedroom, 2-bedroom and 3-bedroom units are respectively 13.73, 17.32 and 22.51 square meters per person (Table 3).

Table 3 Space per person in different unit type

Unit type	Case study flat	Net Internal Floor Area	Mean NIFA	Household size	Mean household size	Space per person (m2)
1-bedroom	RCC	55.15	54.9	4	4	13.73
	Black Star	54.65		4		
2-bedroom	GPS	85.02	87.73	5.1	5.1	17.32
	Mfantsipim	90.44		5		
3-bedroom	CRH	144.47	138.43	7	6.2	22.51
	C-Poly	132.4		5.3		

Considering all 6 cases of floor plans, the mean living space per person in the units is 17.96 m2. This value is very much reflective of the space per person standards in all Africa (less than 20 sqm) according to the UNDP (2004) although small compared to other international standards (Hui et al., 2004; Dol & Haffner, 2010). This is attributable to the size of household. Although the contexts are different, it is noteworthy that the mean useful area per dwelling for the six case study designs of 96.19 m2, approximates closely to what is in even many developed countries such as the UK (86.9) and Netherlands (98.0). However, the space per person is about 50% less when compared to these countries. The Space Per Person (SPP) is 41 m2 in the Netherlands and 44 m2in the UK attributable to the size of the household (or the number of persons per dwelling) which is 2.2 in the UK and 1.9 in The Netherlands (Dol & Haffner, 2010), but 4.4 across Ghana (GSS, 2010), and

5.3 in the case of the units investigated. Thus, it is the large household size in Ghana that contribute to the relatively low space per person measure. This underscores the significance of household as a concept in defining the adequacy of living space. Unlike overcrowding measures such as the bedroom standard, which is based on arbitrary number of bedrooms, space per person assesses the adequacy of dwelling space on the basis of the household size, and how much space is actually available to support household activities.

This is significant because different cultures the world over use space in the home differently (Rapoport, 2005; Hillier, 1996). Dawson (2008) found that Inuit families in Arctic Cananda use space in ways that often do not match the functional categories that structure Euro-Canadian houses such as bedroom, kitchen, and living room. Among these residents, communal sleeping arrangement in the living room was common. In Saudi Arabian homes on the other hand, there are two living rooms – one for strangers and non-family members and one for family and women visitors (Sherwood, 1996). This functional provision and differentiation is thought to reflect Middle Eastern cultural tradition that women must be veiled and protected from strangers. In most large Asian countries and cities, also where living space is at a premium, apartments are relatively small in size with an average floor space per person as low as 15.6 m2 in Hong Kong and 18 m2 in Japan (Hui et al., 2004), and in large Chinese cities, most apartments are without a separate kitchen and bathroom and residents share facilities (Sherwood, 1996). This differs from typical American cultures where individualisation and privacy is at a premium (Pader, 2002). The conclusion is that cultural differences affect the requirement, and hence provision of space in the home. Adequacy of space in terms of size must thus be viewed in light of the prevailing social and cultural practices.

This is the sensitivity that makes space per person a more useful measure of the adequacy of space in the home because it takes into account the differences in the way different societies and cultures organize themselves in a dwelling space, differences that affect the requirement, provision, and hence the adequacy of living space. In addition to the functional requirements for durability and safety, therefore, the World Health Organization (WHO, 2001) observes that each dwelling must provide "sufficient number of rooms, and usable floor area to satisfy human requirements for health and a healthy family life consistent with the prevailing social and cultural pattern of life of the Ghanaian people." This is the cultural adequacy of housing (UN-Habitat, n.d). According to UN-Habitat, a housing unit is not adequate if it does not respect and take into account the expression of cultural identity of the users. The implication is that the adequacy of living space in the home must be viewed in the light of particular social and cultural practices of a people. It is thus context-sensitive.

CONCLUSIONS

The size and adequacy of space in the home affects the quality of life of occupants in many important ways - physically, psychologically, socially and economically. However, different cultures conceive and use space in the home differently, making what can be considered adequate a subject to contextual factors. To meet the wellbeing of occupants while accounting for these differences in the design of houses as well as policy decisions in terms of specification of space standards, the

study demonstrates that space per person (SPP) is more useful measure. This is because it defines the adequacy of living space in terms of the requirement for household activities and the size of the household, two variables that are particularly useful because of their socio-cultural sensitivity, and hence context-responsiveness. For theory development, the study emphasises the need for what Kohler and Hassler, (2002) describe as "context-relevant scientific research", which means seeking the best possible understanding of existing situations in terms of the social, cultural, economic, and physical aspects using local data. The implication is that the concepts, approaches and measures used in research must also be context-relevant, context-sensitive and context-responsive. For practice, it is consistent with how designs are conceived and delivered because (household) activities constitute the unit of analysis in architectural design. Space per person (SPP) also provides a more scientific basis for housing pricing in terms rent prices, as well as real and nominal houses prices compared to the arbitrariness of the number of bedrooms. Overall, the study demonstrates that it is important to constantly rethink the concepts, approaches and methods applied in understanding various social phenomenon. The study has some limitations, nonetheless. First, it was based on only six cases of apartment designs purposively sampled in Cape Coast, Ghana. Although case studies generally provide for an in-depth understanding of phenomenon, the study recognizes that they are also limited in terms of generalisation. Secondly, adequacy of housing as a concept is multi-dimensional with several indicator parameters. This study focused specifically on the adequacy of living space as an indicator of the habitability dimension. In future research, comparing results of similar nature in other context can help further validate the results of this study and establish space per person as an empirically more grounded measure of the adequacy of living space in a dwelling unit.

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