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Level of Knowledge of Building Occupants on Dampness in Walls of Residential Buildings in Ghana

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Abstract

This paper presents the results of a questionnaire survey of inhabitants of 5,800 buildings in four climatic zones in Ghana which sought to assess and document the level of knowledge of these inhabitants on the problem of dampness in walls of buildings. A quantitative approach to data analysis was employed, using percentages and mean score rankings of the factors studied. The results showed some existence of knowledge on the problem of dampness among the building occupants. The results also showed that dampness is often seen on the walls of residential buildings in Ghana and its level of appearance varied from one climatic zone to the other. The symptoms associated with damp walls are 'surface efflorescence just above skirting/floor', 'dampness at the base of walls up to 1.5m in horizontal band', 'stains, especially in horizontal band, noticeably damp in humid conditions' and 'mold growth (on cold surfaces, windows, etc.)'. The findings from this study should create an awareness of how dampness as a problem is on the rise in Ghanaian residential buildings and this should lead to collective responsibility of all stakeholders to find solutions to the problem.

Keywords

Ghana, dampness, residential building, rising damp, building occupants

1. Introduction

Dampness in buildings is moisture that should not be present in a building. When the materials in a building become sufficiently damp to cause material damage or visible mold growth, it is often said that the building has a dampness problem or the building is characterized as a damp building (Burkinshaw and Parrett, 2004). Dampness in all its forms occurs often, and its enormity has been frequently reported in countries like the United Kingdom, United States of America, Australia, Denmark, Canada, Japan, Estonia, Iceland, Norway, Sweden, and Taiwan (World Health Organization, WHO, 2009; Mudarri and Fisk, 2007; Gunnbjornsdotirr et al., 2006). The situation in Ghana is not different, as field surveys carried out have shown that the problem of dampness has assumed an alarming dimension in most residential buildings in several parts of the country (Asamoah et al., 2012). Excessive dampness in buildings is a major problem faced by building occupants and if allowed to continue unchecked buildings may deteriorate to the extent that they ultimately become inhabitable and this will lead to health problems (WHO, 2009). It is in this respect that this study sought to assess and document the level of knowledge of building occupants on the problem of dampness in their buildings.

1.1 Literature Review

Dampness is the wetting of structural elements through moisture rise by capillary action (Seeley, 1994). Dampness, an indication of the moisture content of the air present in a space, is an important factor which determines the quality of the air in relation to human health and comfort and more importantly, its effects on the structural integrity of materials in buildings (Hyvarinen et al., 2002; Canadian Wood Council, CWC, 2000; Singh, 2000; King et al., 2000). Dampness in buildings can cause a number of problems, including the destruction of timber, blocks, bricks, ineffective insulation due to cold bridging and the increased risk of mold growth (Hyvarinen et al., 2002; CWC, 2000; Singh, 2000; King et al., 2000). Dampness in buildings can arise from a number of different sources and can cause a variety of effects, such as wall staining, mold growth, impairment of air quality and respiratory problems in humans (Ahmed and Rahman, 2010; Trotman, et al., 2004; Riley and Cotgrave, 2005; CWC, 2000).

Studies have shown that in 2004, about 20% of buildings in several European countries, Canada and the United States had one or more signs of dampness (WHO, 2009). This estimate agreed with those of a study of 16,190 people in Denmark, Estonia, Iceland, Norway and Sweden, which gave an overall prevalence of indoor dampness of 18% (Gunnbjornsdottir et al., 2006). In the study undertaken by Gunnbjornsdottir et al. (2006), dampness was defined on the basis of self-reported indicators, such as water leakage or damage, bubbles or discoloration of floor coverings, and visible mold growth indoors on walls, floors or ceilings. A study of 4,164 children in rural Taiwan and China showed that 12% of the parents or guardians considered their dwellings to be damp, 30% reported the presence of visible mold inside their houses, 43% reported the appearance of standing water, water damage or leaks and 60% reported at least one of these occurrences (WHO, 2009; Yang et al., 1997). In Singapore, of 4,759 children studied, the prevalence of dampness in each child's bedroom was estimated to be 5% and that of mold was 3% (WHO, 2009; Tham et al., 2007). In Ghana, a study has shown that the problem of dampness in buildings is on the rise Asamoah et al., 2012).

Dampness in the elements of a structure can arise from rainwater penetration in exterior walls, ground water intrusion into basements and crawl spaces, condensation and indoor moisture sources (Ahmed and Rahman, 2010; Riley and Cotgrave, 2005; Trotman et al., 2004).

2. Study Areas

Major towns in the ten administrative regions of Ghana were grouped under four climatic zones- South

Western Equatorial (SWE), Dry Equatorial (DE), Wet Semi Equatorial (WSE) and Tropical Continental (TC) (Figure 1) (Abass, 2009; Fianko et al., 2009; Dickson and Benneh, 1988). The South Western Equatorial Climatic zone is the wettest in Ghana. The rainfall regime is the double maximum type. Mean annual rainfall is above 1900mm and on the average, no month has less than 25mm of rain. The highest mean monthly temperature of about 30°C occurs between March and April and the lowest of about 26°C in August. A typical station for this climatic zone is Axim (Region I, Figure 1) (Abass, 2009). The DE has a mean annual rainfall between 740mm and 890mm. This region is the driest in the country with mean monthly temperature of 28°C. The highest average relative humidity does not exceed 75% and the lowest is about 60% (Dickson and Benneh, 1988). The towns which fall within this zone are Accra, Cape Coast, Takoradi and Ho (Region II, Figure 1) (Abass, 2009). The WSE zone has two rainfall maxima, with a mean annual rainfall of about 200cm. The first rainy season lasts from May to June, and the second from September to October. Relative humidity is normally around 75% (Dickson and Benneh, 1988). The major towns located in this zone are Kumasi, Koforidua and Sunyani (Region III, Figure 1) (Abass, 2009). The Tropical Continental climatic zone has a single rainy season from May to October followed by a prolonged dry season. The mean annual rainfall is about 1000mm to 1150mm. Mean monthly temperatures vary from 36°C in March to about 27°C in August. The major towns which fall within this climatic zone are Navrongo, Wa and Tamale (Region IV, Figure 1) (Abass, 2009).

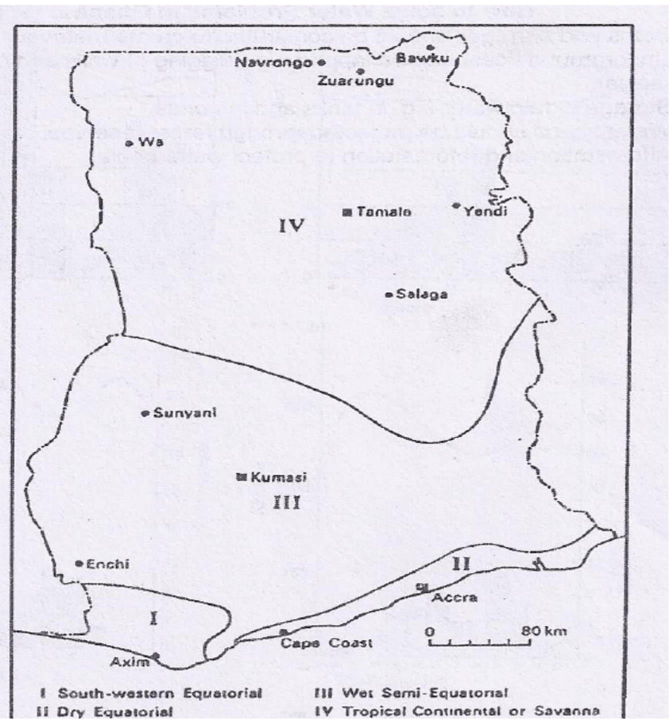

Figure 1. Climatic Regions of Ghana (Source: Abass, 2009)

3. Research Methodology

The study was conducted through field survey by trained assessors to assess and document the level of knowledge of building occupants on the problem of dampness in their buildings. The main instruments used for data collection were structured questionnaire survey and on-site building investigations. Both closed and open-ended questionnaires were administered to building occupants of residential buildings in the four different climatic zones of Ghana between the months of November 2012 and March 2013.

Houses located in eleven major towns in the four main climatic zones were considered in the survey. According to the Ghana Statistical Service, GSS, (2000), the number of buildings located in each of the selected towns are shown in Table 1 (column 3).

A sample size of 5,800 buildings with problems of dampness was selected from the total population of 278,273 buildings in the selected locations using the formula proposed by Yamane (1967) as follows:

$$n= N/1+N\,(e)^{2}$$

Where 'N' = the total population size; 'e'= the standard error of sampling distribution assumed to be 0.013 and 'n' is the sample size.

Proportionate or quota sampling technique was used to select the sample size for each location and the convenience purposive sampling approach was then used to select the residential buildings within each location (representing a cross section of buildings within the four climatic regions of Ghana).

Table 1. Sample size determination of houses surveyed

TOWN	CLIMATIC ZONE	NO. OF HOUSES (GSS, 2000)	NO. OF HOUSES SAMPLED	TOTAL SURVEYED
Sekondi-Takoradi	DE	24,817	517	
Cape Coast	DE	6,847	143	
Accra	DE	131,355	2,738	3,541 (For DE)
Ho	DE	6,853	143	
Axim	SWE	2,694	56	56 (For SWE)
Koforidua	WSE	7,318	153	
Kumasi	WSE	67,434	1,406	1,689 (For WSE)
Sunyani	WSE	5,611	117	
Bolgatanga	TC	3,932	82	
Wa	TC	5,539	115	545 (For TC)
Tamale	TC	15,873	330	

A pilot survey was carried out by the trained assessors to test the appropriateness of the questionnaire with 50 occupants in 50 buildings in Kumasi. The questionnaire was modified and distributed. The questionnaires sought information on three issues. The first part of the questionnaire sought information on the designations of respondents in the houses (owners, tenants, etc.) and the ages of the buildings. In the second part of the questionnaire, respondents were asked to score on the Likert scale of 1-5 how often dampness was seen in their buildings, where 1= 'Not often' and 5= 'Very often'. Respondents were again asked to indicate when the dampness first appeared in their buildings and score on the Likert scale of 1-5 how often the dampness disappeared from the buildings (1= 'Not often' and 5= 'Very often'). The third part of the questionnaire asked respondents to score on the Likert scale of 1-5 the directions of their buildings severely affected by dampness, where 1= 'Not severe' and 5 = 'Very severe'. With the help of the assessors respondents were further asked to score on the Likert scale of 1-5, the level of severity of symptoms associated with dampness in the walls of their buildings. The data from the questionnaire survey were analyzed by mean score rankings and percentages.

4. Results and Discussions

4.1 Demography of Respondents

The results presented in Table 2 show that in the Wet Semi Equatorial climatic zone, 64% of the respondents were owners and 36% were tenants. In the Dry Equatorial climatic zone, 60% of the respondents were owners whereas 40% were tenants. Building owners in the South Western Equatorial climatic zone constituted 44% and tenants constituted 56%. In the Tropical Continental climatic zone, 58% of the respondents were owners and 42% were tenants. The findings therefore show that for the WSE, DE and TC climatic zones, owners constituted majority of the respondents.

Ninety one percent (91%), 86%, 90% and 92% of the buildings surveyed in the WSE, DE, SWE and the TC climatic zones respectively were older than 4 years. This shows that the buildings were susceptible to dampness attacks because studies have shown that the age of buildings is very significant to any dampness study and the older the building the more susceptible it is to dampness (Halim and Halim, 2010; Ahmed and Rahman, 2010). The buildings were therefore, considered reliable for the survey.

Table 2. Demographic characteristics

Characteristics of respondent	CLIMATIC ZONES			
	Wet Semi Equatorial	**Dry Equatorial**	**South Western Equatorial**	**Tropical Continental/ Savanna**
Respondent				
Owner	64%	60%	44%	58%
Tenant	36%	40%	56%	42%
TOTAL	***100%***	***100%***	***100%***	***100%***
Age of dwelling				
1-4 years	9%	14%	10%	8%
5-10 years	20%	25%	30%	23%
11-20 years	28%	27%	6%	19%
Greater than 20 years	43%	34%	54%	50%
TOTAL	***100%***	***100%***	***100%***	***100%***

4.2 Issues on Dampness

4.2.1 Frequency of Dampness Seen on the Walls of the Buildings

Among the issues on dampness, respondents were asked to indicate how often damp was seen on the walls of their buildings. Figure 2 shows a graphical representation of the views of the respondents. Eighty two percent (82%), 80% and 77% of the respondents in the SWE, WSE and the DE climatic zones respectively opined that dampness was often seen in walls of buildings within these climatic zones.

In the Tropical Continental climatic zone however, only 8% indicated that they often saw dampness in the walls of their buildings. Fifty percent (50%) were of the view that dampness does not occur often whilst 35% were of the view that dampness was less often seen.

The results from this study show that dampness occurs everywhere, but is more prevalent in the SWE, WSE and Dry Equatorial Climatic zones of Ghana. This finding agrees well with literature which showed that dampness occurs often and is the most frequently reported cause of building defects in most European countries(WHO, 2009; Mudarri and Fisk, 2007; Gunnbjornsdotirr, 2006).

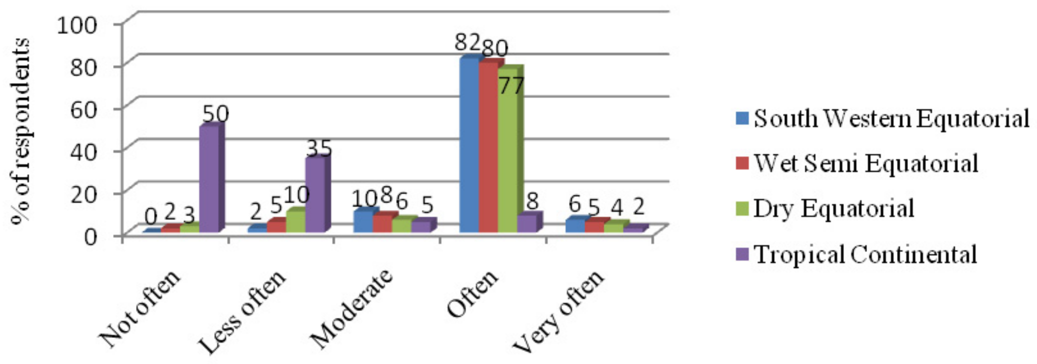

Figure 2. Frequency of dampness seen in walls of buildings

4.2.2 First Appearance of Dampness

The study sought the views of respondents on the first time they observed dampness in the walls of their buildings.

In order of appearance of dampness in the walls of buildings, 75%, 72%, 60% and 58% of the respondents who live in the WSE, TC, SWE and the DE climatic zones respectively observed dampness just after 1 year of construction (Figure 3). Thus, dampness in the majority of buildings surveyed in the four climatic zones appeared 1 year after construction.

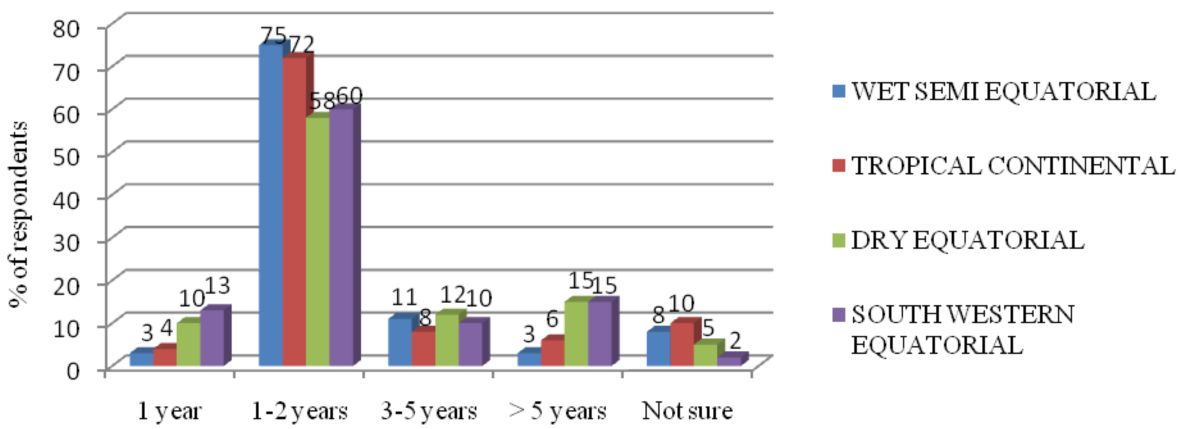

Figure 3. First appearance of dampness

4.2.3 Frequency of Disappearance of Dampness

On the frequency of disappearance of dampness from the walls of buildings, Figure 4 shows the views of respondents in the four climatic zones of Ghana. In the opinion of 54% of respondents in the Wet Semi Equatorial, 50% in the Dry Equatorial and 56% in the South Western Equatorial, dampness does not often disappear from the walls of their buildings. Only 4% of the respondents in the Tropical

Continental climatic zone indicated that dampness rarely disappears from the walls of their buildings.

Eleven percent (11%) of respondents in the WSE climatic zone, 16% in the TC, 18% in the DE and 12% in the SWE climatic zones were not sure of the disappearance of dampness from the walls of the buildings as well. The reason assigned to this problem by the respondents was that at certain times in the year, the problem seems to disappear but at other times, the problem resurfaces. According to Park (1996), certain conditions affect the rate at which dampness appears and disappears from the walls of buildings. Moisture problems in buildings are influenced by a variety of simultaneously existing conditions such as daily and seasonal changes in the sun, prevailing winds, rain, temperature and relative humidity (inside and outside), as well as seasonal or tidal variations in ground water levels (Park, 1996). Damp surfaces encourage the formation of moulds, and the proliferation of mould and mites in conditions of high relative humidity is associated with ill health (Nicol, 2006). Such problems can be minimized by not allowing relative humidity in a building to rise above 70%, except for short periods, although reducing relative humidity below 40% is also undesirable in view of the possibility of increasing the incidence of respiratory discomfort and infection (Nicol, 2006).

The southern section of Ghana, because of its nearness to the sea is more humid than the northern section (Abass, 2009). The variations in the level of disappearance of dampness from the walls of buildings in the four climatic zones in Ghana arise from different moisture contents caused by the differences in relative humidities (RH) (Abass, 2009; Dickson and Benneh, 1988). Relative humidity levels on the coast are generally between 95% and 100% during the night and early morning when the air over the land is cooler than that over the sea; but decrease in the afternoons when the water vapour fills a volume of air whose holding capacity has increased through heating by the sun (Abass, 2009). The higher the relative humidity, the higher the moisture content in the atmosphere. A relative humidity between 95% and 100% means the moisture content in the area is very high and the atmosphere is wet. Wet season accompanied by a rise in the water table can result in an increase in the height of the capillary rise of moisture (Lieff and Trechsel, 1988). This could be a possible reason why respondents who live in buildings in the WSE, DE and SWE climatic zones do not often see a disappearance of dampness from the walls of buildings.

In the TC climatic zone, relative humidity could fall between 20% and 30%, which is an indication of lower moisture content in the atmosphere. Lower moisture content means the atmosphere is almost dry and walls cannot absorb enough moisture. During a dry time, the soil around the base of the wall may draw moisture out of the masonry (Lieff and Trechsel, 1988) and this will decrease the amount of moisture present in the wall. The TC climatic zone is the driest of all the four climatic zones in Ghana and this explains the reason why 57% of the respondents indicated that the disappearance of dampness from the walls of buildings was very often.

In buildings located in some parts of the United Kingdom and Northern Ireland, dampness problems are reported to arise due to seasonal changes (Ryan, 2002). In Ghana, daily and seasonal changes in the sun, prevailing winds, rain, temperature and relative humidity (inside and outside), as well as seasonal or tidal variations in ground water levels are among the conditions which affect dampness in walls of residential buildings.

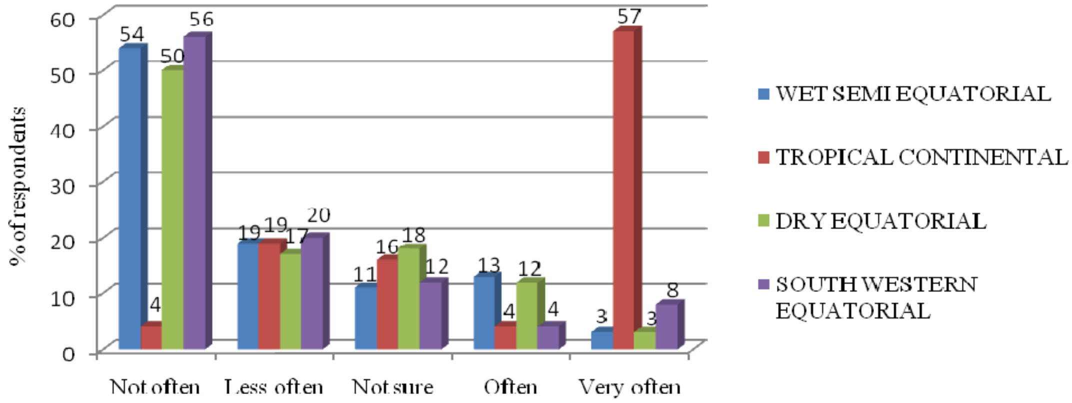

Figure 4. Frequency of disappearance of dampness

4.2.4 Directions of Buildings Severely Exposed to Damp

The study sought the views of respondents on the directions of their buildings severely exposed to damp. The results are presented in Table 3 in the form of mean scores. For this study, a factor is deemed severe if it has a mean value of 2.5 or more (Field, 2005).

Mean scores of the four major directions considered in buildings in the Dry Equatorial climatic zone are all greater than the mean value of 2.5. This is an indication that all the four directions of the buildings studied in this climatic zone are susceptible to dampness attacks. The findings further show that the Eastern part of buildings located in this climatic zone is the most severely affected direction by dampness. In the Tropical Continental and the Wet Semi Equatorial climatic zones, the Eastern directions of buildings are severely exposed to dampness with mean values of 2.65 and 2.52 respectively.

Table 3. Directions of buildings exposed to severe damp

	Dry Equatorial			**Tropical Continental**			**Wet Semi Equatorial**			**South Western Equatorial**		
Wall Direction	**Mean**	**Std. Dev.**	**Rank**	**Mean**	**Std. Dev.**	**Rank**	**Mean**	**Std. Dev.**	**Rank**	**Mean**	**Std. Dev.**	**Rank**
North	2.73	1.16	*4th*	2.21	0.69	*2nd*	2.39	1.16	*2nd*	2.41	1.19	*3rd*
East	3.25	1.17	*1st*	2.65	1.24	*1st*	2.52	0.83	*1st*	2.55	1.18	*2nd*
South	3.09	0.96	*3rd*	2.41	0.89	*3rd*	2.42	1.14	*3rd*	3.30	1.62	*1st*
West	3.18	1.17	*2nd*	1.85	0.82	*4th*	2.34	1.01	*4th*	2.40	1.34	*4th*

In the South Western Equatorial climatic zone, the southern direction of buildings (with mean score of 3.30) is severely exposed to dampness. The eastern directions of buildings located in the DE, TC and WSE climatic zones are severely exposed to damp, whereas in the South Western Equatorial climatic zone, the southern directions of buildings experience severe exposure to dampness. In Aberdeen in the United Kingdom, North and North-East facing walls of buildings are more frequently affected by severe dampness (Young, 2007).

4.2.5 Symptoms associated with Dampness in the Walls

Dampness in the masonry walls of buildings are associated with symptoms, some of which are hidden and others visible. Respondents in the four climatic zones were asked to indicate the severity of symptoms associated with dampness in the walls of their buildings. Table 4 show that all the 10 symptoms (100%) were considered severe in buildings in the Dry Equatorial climatic zone, 9 out of 10 symptoms (90%) were identified as severe in buildings in the Tropical Continental climatic zone, 8 out of 10 symptoms (80%) were considered severe in buildings in the Wet Semi Equatorial climatic zone and 6 out of 10 symptoms (60%) were considered severe in buildings in the South Western Equatorial climatic zone.

Mean scores of all the symptoms associated with the dampness in walls of buildings in the Dry Equatorial climatic zone evaluated are greater than the mean value of 2.5. This indicates that in the opinion of respondents, all the ten symptoms are highly associated with dampness and severe in the walls of buildings. The results further show that 'mold growth (on cold surfaces, windows, etc.)' and 'stains, especially in horizontal band, noticeably damp in humid conditions' are the first two symptoms severely associated with dampness in buildings in the Dry Equatorial Climatic zone. In the TC Climatic zone, 'surface efflorescence just above skirting/floor' and 'free surface water, water run marks, etc' are the first two symptoms which are severe and associated with dampness in buildings. Decayed skirting and dampness on first floor and above were identified as symptoms which are not severe.

Table 4 further show that in the WSE climatic zone, the two most severe symptoms associated with dampness in buildings are 'stains, especially in horizontal band, noticeably damp in humid conditions' and 'dampness at the base of walls up to 1.5m in horizontal band'. 'Dampness around the edges of solid floors' and 'blistering and flaking of paint' were identified as the last two symptoms with low level of severity among buildings in this climatic zone. In the South Western Equatorial climatic zone, 'surface efflorescence just above skirting/floor' and 'mold growth (on cold surfaces, windows, etc.)' were identified by respondents to be the two most severe symptoms associated with dampness in buildings in this climatic zone. However, 'dampness on first floor and above' and 'dampness around edges of solid floor' were less severe among buildings in this climatic zone.

Mold growth does not require the presence of standing water: it can occur when high relative humidity or the hygroscopic properties of building surfaces allow sufficient moisture to accumulate (United States Environmental Protection Agency, USEPA, 1991). The relative humidity and temperature often vary within a room, therefore if one side of the room is warmer and the other side is colder, the colder side of the room will have a higher relative humidity than the warmer side (USEPA, 1991). The highest relative humidity in a room is always next to the coldest surface and this is likely to be the location where the first condensation occurs (USEPA, 1991). Though 'mold growth (on cold surfaces, windows, etc.)' is a symptom which was highly associated with buildings in the four climatic zones of Ghana, a critical look at Table 4 shows that it is on the rise in the South Western Equatorial climatic zone (the first most severe symptom highly associated with buildings). This is so because in the SWE average monthly relative humidity levels (based on figures recorded each day at 12 noon) are highest and range between 75-80% (Abass, 2009). This is an indication of the reason why a high level of severity was assigned to 'mould growth' as a symptom associated with dampness in buildings in this climatic zones.

Cyclic wetting and drying brought about by seasonal changes is an important driver of salt attack or efflorescence (Young, 2008). Efflorescence can occur simply through changes in humidity (Young, 2008). During the dry period when the water evaporates from the walls, the salt is always left behind (as salts cannot evaporate) and the salt solution in the wall becomes more concentrated (Young, 2008). As more salts are brought into the wall the salt solutions are further concentrated as the moisture evaporates. When the solution reaches a condition known as saturation or super - saturation, crystals will begin to form (Young, 2008). In the Dry Equatorial climatic zone, 'surface efflorescence just above skirting/floor' was ranked first as the most severe symptom associated with dampness in buildings. This may be attributed to the long period of dryness (Abass, 2009; Dickson and Benneh, 1988) which affects the rate at which water evaporates from the walls of buildings. As most of the water in these walls contains salts, the salts are left behind due to the rapid evaporation caused by the drying condition.

Whereas the literature identified mold growth to be the most dominant symptom associated with dampness in the UK and Northern Ireland (Young, 2008; Ryan, 2002), the results from this study show that 'surface efflorescence just above skirting/floor', 'dampness at the base of walls up to 1.5m in horizontal band', 'stains, especially in horizontal band, noticeably damp in humid conditions' and 'mold growth (on cold surfaces, windows, etc.)' are symptoms which are severe and associated with dampness in buildings in the Dry Equatorial, Tropical Continental, Wet Semi Equatorial and the South Western Equatorial climatic zones in Ghana respectively.

Table 4. Symptoms associated with dampness in buildings

	Dry Equatorial			Tropical Continental			Wet Semi Equatorial			South Western Equatorial		
Symptom	**Mean**	**Std Dev**	**Rank**	**Mean**	**Std Dev**	**Rank**	**Mean**	**Std Dev**	**Rank**	**Mean**	**Std Dev**	**Rank**
Decayed skirting	2.58	0.78	*9th*	2.65	1.52	*9th*	2.55	1.44	*8th*	2.67	0.71	*6th*
Dampness around edges of solid floor	3.47	1.31	*6th*	3.82	0.92	*6th*	2.17	1.29	*9th*	1.58	0.83	*10th*
Surface efflorescence just above skirting/floor	4.45	0.54	*1st*	4.16	0.98	*3rd*	4.22	0.90	*4th*	4.38	0.80	*2nd*
Dampness at the base of walls up to 1.5m in horizontal band	4.32	0.70	*3rd*	4.22	0.75	*1st*	4.44	0.54	*2nd*	4.32	0.65	*3rd*
Stains, especially in horizontal band, noticeably damp in humid conditions	4.34	0.59	*2nd*	4.05	1.08	*5th*	4.83	0.37	*1st*	4.20	0.47	*5th*
Mold growth (on cold surfaces, windows, etc.)	4.29	0.82	*4th*	4.06	1.01	*4th*	4.24	0.62	*3rd*	4.52	0.50	*1st*
Free surface water, water run marks, etc.	3.84	0.73	*5th*	4.22	0.88	*2nd*	4.18	0.82	*5th*	4.30	0.67	*4th*
Blistering and flaking of paint	2.67	0.71	*8th*	2.71	0.75	*7th*	1.99	1.03	*10th*	2.44	1.03	*7th*
Softening and deterioration of plaster	3.07	1.07	*7th*	2.68	0.91	*8th*	3.05	0.72	*6th*	1.92	0.80	*8th*
Dampness on first floor and above	2.55	1.44	*10th*	1.39	0.58	*10th*	3.05	0.91	*7th*	1.70	0.84	*9th*

5. Conclusions

This paper sought to assess and document the level of knowledge of building occupants on the problem of dampness in the walls of buildings. The results have shown that building occupants in the four climatic zones in Ghana demonstrated some level of knowledge regarding dampness in the walls of their buildings. The results further showed that dampness is everywhere, but more prevalent in the South Western Equatorial, Wet Semi Equatorial and Tropical Continental Climatic zones. However, its dominance is experienced most in the wettest area of Ghana that is the South Western Equatorial climatic zone. The results also showed that dampness in majority of the buildings surveyed in the four climatic zones occurred just after one year of construction. Building occupants in the DE, TC and the WSE climatic zones indicated that the eastern directions of their buildings were severely exposed to dampness, whereas those in the South Western Equatorial climatic zone identified the southern parts of buildings to be severely attacked by dampness. From the results 'surface efflorescence just above skirting/floor', 'dampness at the base of walls up to 1.5m in horizontal band', 'stains, especially in horizontal band, noticeably damp in humid conditions' and 'mold growth (on cold surfaces, windows, etc.)' are the most severe symptoms of dampness associated with buildings in the Dry Equatorial, Tropical Continental, Wet Semi Equatorial and the South Western Equatorial climatic zones respectively. The findings suggest to stakeholders to come together and find solution to this problem. Further studies into the severity of symptoms associated with different types of dampness should be conducted.

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