# *SICK BUILDING SYNDROME AN APPROACH THROUGH BIO-PSYCHOSCOIAL MODEL*

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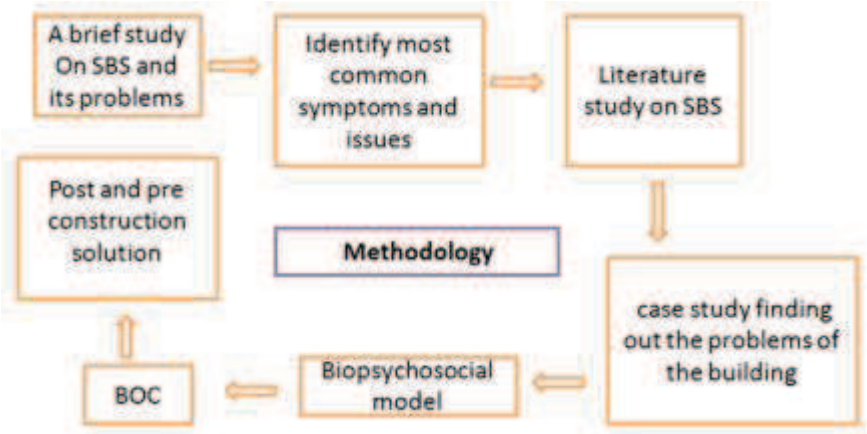
**Abstract:** The research is a qualitative analysis of the sick building syndrome instead of making it in a detailed manner of quantitative analysis which usually researchers had done before Methods: Paper is a study of SBS based on document and interviews so to clearly understand symptoms and its relation with bio psychosocial model. Paper deals with SBS concerns and its surrounding issues and how it affects people through an indirect method.




**Aim:** To study on bio psychosocial model and its role with buildings. To study on human behaviour and reactions to different type of buildings. To study on SBS symptom's and effects

**What is Sick building Syndrome?:** The term "sick building syndrome", was first coined in the 1970s. It is basically to report on the illness which is directly caused by the buildings.
"*The **sick building syndrome** (SBS) is used to describe a situation in which the occupants of a building **experience acute health- or comfort-related effects** that seem to be linked directly to the time spent in the building. No specific illness or cause can be identified"*
USEPA 1991
*"Sick Building Syndrome (SBS) describes a medical condition where people in a building suffer from symptoms **of illness or feel unwell for no apparent reason**. The symptoms tend to increase in severity with the time people spend in the building, and improve over time or even disappear when people are away from the building"*
WHO 2000

**Signs and Symptoms: Possible Symptoms of SBS in Medical Terms:**
**1. Respiratory**
- Runny nose
- Sneezing

- Dry sore throat
- Blocked nose
- Nose bleeds
- Allergic Rhinitis (repetitive sneezing and a runny nose)
- Sinus congestion
- Colds
- Influenza like symptoms
- Dry Cough
- Throat irritation
- Wheezing when breathing
- Shortness of breath
- Sensation of having dry mucus membranes
- Hoarseness of the voice due to inflammation of the throat and larynx
- Sensitivity to odours
- Increased incidences of building related asthma attacks.

**2. Eye irritation**
- Eye dryness
- Itching of the eyes
- Watering of the eyes
- Gritty eyes
- Burning of the eyes
- Visual disturbances
- Light sensitivity

**3. Dermal Irritation**
- Skin rashes
- Itchy skin
- Dry skin
- Erythema (Redness or inflammation due to congestion in, and dilation of, the superficial capillaries of the skin.)
- Irritation and dryness of the lips
- Seborrheic dermatitis
- Periorbital eczema
- Rosacca
- Uritcaria
- Itching folliculitis

**4. Cognitive Complaints:**
- Functional headache that affect a person's performance, but which fail to reveal evidence of physiological or structural abnormalities
- Migraine headache
- Tension headache
- Sinus headache due to swelling of the mucus membranes
- Mental confusion
- Lethargic
- Difficulty in concentrating
- Mental fatigue
- General fatigue that starts within a few hours of coming to work and which Ceases after the person leaves the building
- Unable to think clearly
- Drowsy

**5. Gastrointestinal symptoms**

- *Nausea*

**6. Other**

- Dizziness
- Unspecified hypersensitivity reactions
- Personality changes (that may be due to stress or ill health)
- Exacerbation of pre-existing illnesses such as asthma, sinusitis or eczema

**The three groups of the symptoms of sick building syndrome**

***Group 1***
***Headaches:*** *Caused by indoor air circulation rates*
***Lethargy:*** *Air pollution.*
***Nausea:*** *Carbon monoxide*
***Drowsiness and Dizziness*** *Caused by the neighbourhood industrial wastage*
***Group 2***
***Congestion*** *Outdoor air quality, HVAC related issues, construction materials.*
***Swelling*** *Hypersensitive and already existing medical conditions*
***Itching*** *flicker caused by magnetic ballasts and compute glare*

***Sub-clinical problems*** *e.g., eye strain, muscle strain and fatigue symptoms*
***Group 3***
***Cough:*** *Caused by thermal discomfort*
***Breathing issue****:* *Dust inside the buildings*
***Fever:*** *Microbial contamination the building.*
***Discomfort:*** *Cooling towers, HVAC system [including ducting] or outdoor air. Job related to psychosocial factors.*

**Causes for Sick Building Syndrome**

The United States Environmental Protection Agency (2006) list The causes of SBS as: "*Inadequate ventilation*
*Chemical contaminants from outdoor sources;*
*Chemical contaminants from indoor sources; and*
*Biological contaminants"*

**Chemical Contaminants from Outdoor Sources:** The polluted air which is coming into the building from the vechicles and other possible sources because of the poorly designed inlet and outlets the polluted air traped inside the building causes the increase in chemical contaminates

**Chemical Contaminants from indoor sources**

Adhesives,
Upholstery,
wood products,
chemicals pesticides and cleaning,
formaldehyde ozone and high level Volatile Organic Compounds (VOCs).
*"A major contributor or source of high level VOCs is environmental tobacco smoking in addition to other toxic compounds and irrespirable particulate matter"* Health, 2006.

**Biological Contaminants:**

Pollens
Bacteria,
viruses
moulds.

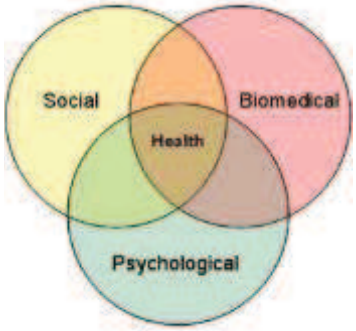
This contaminates grow in the wet areas and ceilings which makes the area to grow moulds and release the toxic substance and bad smell to the building

**Inadequate Ventilation:** Windows in air tight building are usually meant to close in long hours leading to insufficient air to the indoor environment and continue usage of air conditioner causes to pollute the indoor environment because of the recirculation of air. This reticulated air leads to breathing problems and asthma to the occupants.

**An Introduction to Bio Psycho Social Model:** The bio psychosocial model is a way though which the psychologist used to examine certain dieses outcomes in medical field. This model clearly tells about the patient history of symptoms it is a brilliant model designed not only for psychologist it can be interrupted in various fields.

**What Is the Bio Psychosocial Model?**
The 'bio' component of this theory relates aspects of biology that influence health. These might include things like brain changes, genetics, or functioning of major body organs, such as the liver, the kidneys, or even the motor system. For example, let's say Alex has an accident that leaves his with reduced movement in his right arm. This biological change might influence how he feels about himself, which could lead to depression or anxiety in certain situations

The 'psycho' component of the theory relates psychological components, things like thoughts, emotions, or behaviours. Alex might go through many different psychological changes. He might experience decreased self-esteem, fear of judgement, or feel inadequate in her life or job. These changes in thoughts might lead to changes in behaviours, like avoiding certain situations, staying at home, or quitting her job. As he engages in these behaviours, his injury might worsen, or she could suffer further depression and anxiety.

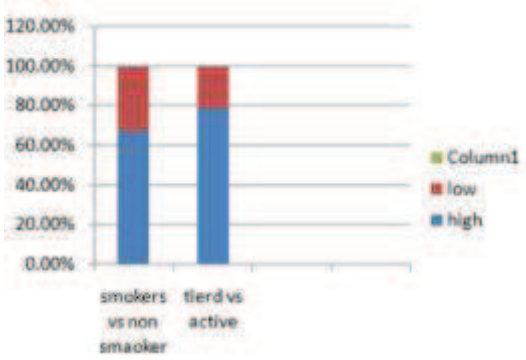


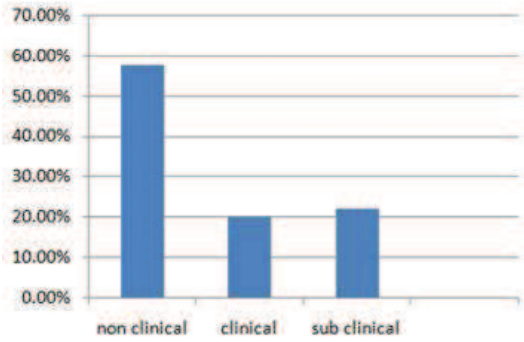

The 'social' component of the BPS model relates social factors that might influence the health of individual, things like our interactions with others, our culture, or our economic status. A possible social factor for Alex could be his role in bread wining. Perhaps Alex is a new employee. An injured arm might reduce his ability to care about his family independently. Being unable to fulfil this social role might trigger problems with his wife or other family members, causing Joan stress that could lead to further biological or psychological problems.

An important connection to make here is that the elements of the BPS model are all connected. Biology can affect psychology, which can affect social well-being, which can further affect biology, and so on. Alex biological state changed, which affected his psychological state and social interactions, which all went on to affect each other over again.

***CASE STUDY 1: QUANTITATIVE ANALYSIS***
Intangible pollutant – **noise**
**Investigation on South African music venues**

Comfort criteria were exceeded in all music venues which caused stress.
Only 89.9% of respondents did experience tiredness.
Respiratory infection was higher in music venue staff than in office staff
Average age of staff in music venues was 25 years and 67.37% were smokers.
Burning eyes was the symptom causing most concern for 57.89% of respondents
Noise level mean for music venues was Neq 99,67 dB (A)
34.7% - music as stressor
16.9%- people noise
57.5%- hypertension and diabetics




**Relation Through Bio-Psychosocial Model:** Prolonged exposure to high noise changes how the brain processes speech, potentially making the difficulty in distinguishing speech sounds, according to neuroscientists. Exposure to extremely high sounds leads to damage of the hair cells, which act as sound receivers in the ear. Once damaged, the hair cells wont grow back, leading to noise-induced hearing loss. Here in this case the prolonged hearing of the noise level induced the brain damage and neurons transmitter which causes a specific stress so the people working in the music venues are prone to smoking habits.

**Social Factor**: The most population in the music venues were under 25 as African country were prone to tobacco and drugs the social setup itself make a middle aged man to take tobacco and weed which triggers through the stress in venues

**Biological Factor**: As the noise and the music in venues causes stress it leads to biological changes in the brain it will reduce the efficiency of nero transmitter signals to the brain which causes reduction in brian efficiency and increase in the dopamine level.

Psychological factor: the bio social factor motivates the individual to increase the dopamine level to reduce the stress it is basic as a children eating lot of chocolate which help them to reduce the stress and pressure caused by external factor which will hinder their physical and mental growth the brain stimulates the children to eat cocoa same way the individuals were taking the tobacco to reduce the stress level which further leads to lungs caner and hypertension

***CASE STUDY 2: QUALITATIVE ANALYSIS***
Tangible pollutant: VOC ( volatile organic compounds)
Office buildings- north Sweden
In north Sweden the labor inspector identifies one Office with non specific health problem which got into notice on 1990 and till 1996.Originaly the office were constructed in 1982 with concrete work, brick walls, steel sheet roof, linoleum flooring and mechanized ventilation with air exhaust. 16 men worked in the office since from 1982.

**The Causes**: the local OSH identified seven informant from which the case was taken over to the next level of findings which were concluded as because if mechanized ventilation the air is recirculated into

the building causing a major problem in 1994 and because of it RH content got raised 90% to 95% and the glue beneath the linoleum flooring was wet and passage pipe between the building was not tight allowing the passage air inside the building.

Remedial measures: Between 1994 to 1995 the flooring was totally replaced with non-glue substance and the pipes were replaced with PVC.

Building occupancy complaint (BOC): After the building got its original shape again complaints got registered at 26 February 1996 on same issues because of the organization negligence in removing the new ceiling. Usually a holiday should be provided for the day of construction instead of it these guys made the workers to stay and work on the day which create some hatred towards the organization.

**Biomedical and psychological model**: **neurogenic switching:** An impulse at the onsite caused by voc and chemical contamination is thought by redirecting by the means of liberated neuropepticides to some ditatnt organs For example, the brain where they assume to cause the symptoms for example headache such biomedical models are compatible with an assumption to an exposure to the chemical content.

**Parameters to be Considered in Stage of Pre Construction:**
Hiring a good design team/Architect
Seeking an professional construction firm for site works
Reduce the drawing errors in design stage and efficient use of spaces
Natural cross ventilation and standard amount of lighting should be provided in each space
Strictly following the norms and standards of NBC
Usage of green materials in interiors.
Sustainable and climatic responsive built spaces
Usage of locally available material for construction to avoid alien feeling in our building
Design the buildings in Indian context with vernacular spaces
Reduce the usage of chemical contaminants in the material and using the low VOC paints and varnishes
Efficient design of high humid content spaces like toilets, ducts, dish wash area, HVAC etc

**Parameters to be Considered in stage of Post Construction:**
**Communication:** it suggests the use of an integrated biopsychosocial perspective, Which implies that suspected causative factors should be Removed rapidly and with all efforts made to ensure effective communication in such ways that trust is maintained Between propnetor,employer and employees.

**Conclusions:** Quantitative study on sick building seemed to fail to appreciate the social dynamics from which the data are gathered. The present study suggest that the neglect of the psychological perspective may leads to became a chronically sick in spite of from a biomedical perspective, rational remedial action. Therefore, it suggests the use of an integrated biopsychosocial perspective, Which implies that suspected causative factors should be removed rapidly and with all efforts made to ensure effective communication in such ways that trust is maintained Between propnetor, employer and employees.

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