Assessment of wellbeing in an indoor office environment

Philomena M. Bluyssen*, Sabine Janssen, Linde H. van den Brink, Yvonne de Kluizenaar

TNO, Delft, The Netherlands

ARTICLE INFO

Article history:
Received 9 March 2011
Received in revised form 17 June 2011
Accepted 25 June 2011

Keywords:
Office environment
Wellbeing
Health and comfort
Assessment
Indicators

ABSTRACT

Relationships between indoor building conditions and wellbeing of occupants are complex; many indoor stressors can exert their effects additively or through complex interactions. It has been shown that exposure to these stressors can cause both short-term and long-term effects. Relevant relations between measurements of chemical and physical indoor environmental parameters and effects have been difficult to make. To increase the chance on successful assessment of cause-effect relationships in future indoor environmental quality (IEQ) investigations, there seems to be a need to improve procedures applied to gather the relevant information. From different fields of expertise knowledge was retrieved on how and why people respond to external stressors, which factors, parameters or indicators can be used to explain these responses and how to assess those. No consensus exists on which physical, physiological, psychological or social indicators should be applied to explain these responses. However, several existing techniques are available and promising innovative techniques are being developed, of which the applicability needs to be explored. The review results in a better overview of which factors are important to consider in future studies.

© 2011 Elsevier Ltd. All rights reserved.

1. Introduction

Previous studies have shown that the relationships between indoor building conditions and wellbeing (health and comfort) of occupants are complex (e.g. [1–5]). There are many indoor stressors (e.g. thermal factors, lighting aspects, moisture, mould, noise and vibration, radiation, chemical compounds, particulates) that can cause their effects additively or through complex interactions (synergistic or antagonistic). It has been shown that exposure to these stressors can cause both short-term and long-term effects. In office buildings, a whole range of effects have been associated with these stressors such as Sick Building Syndrome (SBS), building related illnesses and productivity loss. More recent studies have indicated that indoor building conditions may also be associated with mental health effects [6], illnesses that take longer to manifest (e.g. cardiovascular disease [7,8]; a variety of asthma-related health outcomes [9]) or even obesity [5].

Although previous studies have shown associations between indoor stressors and comfort, health and productivity in an office environment [10–12], relevant relations between measurements of chemical and physical indoor environmental parameters and effects have been difficult to establish [13,14]. This may be explained by the following [15]:

- Many exposure-response relationships have not yet been (sufficiently) quantified;
- Little is known on the complex interactions between risk factors (or parameters) in the indoor environment and effects are not all known [16];
- Many risk factors may currently not even have been identified;
- Factors other than indoor environmental aspects (e.g. social and personal factors) may influence the effects;
- Exposure and response may be time dependent (e.g. daily, weekly and seasonal patterns);
- The needs and requirements of people are subject to change over time: Requirements and responses of people today differ from those people living 100 years ago;
- Previous exposures and circumstances are often unknown but may influence and therefore may be important to consider.

Basically, it may largely be brought back to the fact that insight into the mechanisms underlying the relationships between indoor environmental aspects and wellbeing is still limited, both at the receiver side (the exposed person) and at the sender side (sources of exposures/stimuli). Because we simply do not know all the interactions or mechanisms taking place between the sources that produce/cause the stimuli, among the stimuli, and between the stimuli and the exposed persons, IEQ investigations short-cuts have been taken. In a short-cut, the building characteristics (such as having an HVAC system) or measures taken (such as a maintenance or cleaning schedule) are directly related to comfort or health.