

# IEQ in domestic workspaces: indicators and perceptions in Spanish homes

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## ABSTRACT

Teleworking is a flexible work modality whose analysis has mainly focused on organizational aspects, while a research gap remains regarding the indoor environmental quality of domestic spaces where it takes place. From an architectural and environmental health perspective, variables such as thermal, acoustic and visual comfort, as well as indoor air quality, are known to directly influence well-being and productivity. These conditions are more difficult to assess in the home environment due to its private and heterogeneous nature, which justifies the need for specific studies examining their relationship with the perceived adequacy of teleworking spaces.

A nationally representative study was conducted through an online survey of 65 questions, gathering at least 1,150 responses proportionally distributed across Spain. Quotas by sex and age were applied, with a  $\pm 3\%$  margin of error and a 95% confidence level. The analysis focused on the variable “adequacy” of the teleworking space, relating it to sociodemographic factors, housing characteristics, workspace conditions, digital resources, ergonomics, and indoor environmental quality components. Binary logistic regression was used to identify significant predictors. Data were collected in May 2025 and analyzed using JASP and R.

Besides, an on-the-ground monitoring campaign in home-based workspaces was carried out during winter 2025-2026, which enriched the analysis, with supplementary info on how people interact with their work settings at home, and what indoor environmental parameters are more relevant for them, with implications on their perceived well-being.

The results show that adequate teleworking spaces are associated with higher education levels, higher income, adequate digital resources, positive prior teleworking experience, managerial positions, and intellectually demanding tasks performed from home on a regular basis. No significant differences were found by age or gender. At the residential level, adequacy was related to dwellings built after 1979, in good condition, larger in size, owner-occupied, and with good environmental conditions. Inadequacy was linked to physical deficiencies of the workspace and thermal discomfort, particularly in winter. Logistic regression highlighted indoor air quality as the most influential factor in perceiving the workspace as adequate, followed by overall lighting, artificial lighting satisfaction, and adequate natural light. An inadequate heating system showed a negative association.

In conclusion, the perceived adequacy of teleworking spaces depends on both sociodemographic and occupational factors as well as housing characteristics, with indoor air quality, lighting, and thermal comfort playing a decisive role.

## KEYWORDS

Telework, indoor environmental quality (IEQ), work setting, housing, indoor air quality (IAQ)