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SESRI Policy Brief

Public Survey on Indoor Air Pollution in Qatar and Its Health Implications

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Studies have shown that exposure to indoor air pollution is more dangerous than outdoor air pollution and has more harmful health effects, given that concentrations of indoor air pollutants are often higher than those typically found outdoors. Air quality and decreasing diseases and deaths caused by it are among the most important sustainable development goals (SDG's), which include reducing mortality and illnesses from air pollution (SDG 3.9.1), promoting clean energy at the household level (SDG 7.1.2), and improving air quality to reduce the environmental impact of urban areas (SDG 11.6.2). This policy brief is based on the results of the study conducted by the Social and Economic Survey Research Institute at Qatar University, titled "Indoor Air Pollution in the State of Qatar," aiming to raise awareness about indoor pollutants, their consequent health concerns, and policies that can help reduce indoor air pollution. Some essential recommendations for a healthy and sustainable life are also presented.

Globally, indoor air pollution is categorized as one of the biggest environmental issues[1] resulting from various household activities such as cooking, burning, smoking, usage of electronic devices, and other consumer products. Sources of indoor air pollution also include emissions from building materials, pet ownership, restroom gases, and practices such as burning incense and scented candles, which are considered common indoor pollutants in the Arabian Gulf region as these practices have been part of the local lifestyle for centuries, dating back to the pre-Islamic Arabian Peninsula[2].

Smoke is considered one of the most dangerous indoor air pollutants. Studies have found that anthrax particles from smoke are the most commonly found in lung tissue throughout history. According to the World Health Organization, air pollution is one of the leading causes of diseases and premature deaths worldwide[3]. Indoor air pollution poses a significant risk of acute lower respiratory tract infections in adults and contributes to 22% of all adult deaths from pneumonia. Additionally, 23% of all deaths from chronic obstructive pulmonary disease (COPD) among adults in low- and middle-income countries are due to exposure to indoor air pollution. Approximately 11% of adult lung cancer deaths are attributed to exposure to carcinogens from household air pollution[4]. Despite the confirmed negative impact of burning incense and candles on human health[5], and to the best of our knowledge, this study is the first attempt in Qatar to survey public opinion on this matter. The study aims to raise awareness about indoor air pollutants and their adverse effects in a region ranked among the most polluted globally. It also aims to offer some recommendations for avoiding indoor air pollution and to enjoy a healthy life.

This brief presents the various indoor air pollutants we are exposed to daily. Given the difficulty of covering all pollutants, we focused on sources of smoke, which are considered the most dangerous pollutants, such as incense and scented candles.

Indoor Air Pollution Project: Demographic Characteristics of Respondents

The Indoor Air Pollution Project is one of the projects by the Social and Economic Survey Research Institute. It surveys the public's opinions on indoor air pollutants, their types, and the health effects resulting from their use. Data was collected through computer-assisted telephone interviews (CATI) with a sample of 600 respondents, both Qatari nationals and expatriates .The questionnaire consists of five sections; the first is the demographic characteristics, followed by a section on public's awareness of daily indoor pollutants and a section that explores the correlation between indoor and outdoor air pollution and how they affect each other. The

third section includes the correlation between air quality and respiratory diseases, along with the symptoms caused by them. In the fourth section, some strategies to mitigate the severity of indoor pollution are presented, and the respondents were asked to express their opinions on the effectiveness of these strategies. The final section reviews some policies aimed at reducing indoor air pollution to share with the public and consider their opinions. The respondents for this study were 19% Qatari nationals and 81% white-collar expatriates. Of the total sample, 58% were male and 42% were female. The age distribution of the respondents indicates that most of the sample fell within the age group of 35-44 years (32%), followed by 31% who were 45 years and above, while 26% were between 25-34 years old and 11% were between 18-24 years old. With regards to marital status, 72% of the respondents were currently married, 4% were previously married, and 24% had never been married. The results showed that 37% of the sample had no children under the age of 12, while 59% reported having children under the age of 12. The majority of the sample (46%) had a bachelor's degree, 25% had a high school diploma or less, and 19% had postgraduate education.

Figure 1. Respondents' perceptions of indoor air pollutants

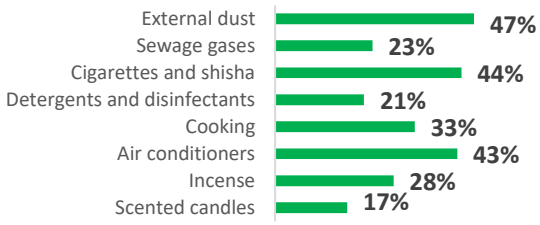
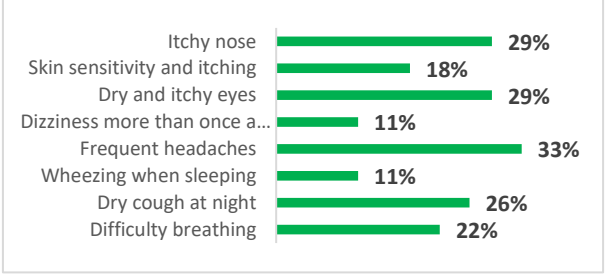


Figure 1 illustrates respondents' perceptions of indoor air pollutants in Qatar, highlighting key sources such as daily household activities like cooking, burning incense, and the use of detergents, which have become increasingly used especially during and after the COVID-19 pandemic. This has led to an increase in volatile organic compounds (VOCs) and other chemicals in the indoor environment. Additionally, the lack of proper ventilation has resulted in higher levels of indoor pollutants than the recommended percentages for a healthy environment[5] .Furthermore, the desert climate of the Qatar, combined with increased industrial activities and infrastructure development preceding the World Cup, has led to an increase in variables associated with risen outdoor air pollution, including noise, dust, heavy traffic, and construction work. This, in turn, influenced respondents' perceptions, leading them to view dust as the largest source of indoor air pollution. Despite the proven adverse effects of using incense and scented candles, respondents ranked them last on the list of pollutants due to their association with customs, traditions, and beliefs. Many believe that incense and scented candles are sources of comfort and hope. Although there are limited studies on the health effects of Arabian incense, one study conducted on 200 Qatari children (aged 2 to 12 years) with asthma found that 100 of these children were significantly exposed to incense and oud compared to the group that was not exposed to it[6]. Moreover, low-burning incense and candles take longer to release their full aroma, which means the indoor space is affected by smoke for an extended time.

Furthermore, it has been found that both traditional incense and oud emit smoke containing particulate concentrations and levels of gases such as carbon monoxide, sulfur dioxide, nitrogen oxides, and formaldehyde. In another study, it was proven that 24 hours after exposure to these gases, human lung cells exhibited an inflammatory response similar to the symptoms of asthma and other respiratory problems in lung cells exposed to cigarette smoke[9]. From these findings, it is evident that awareness programs about the risks of using incense and scented candles are crucial, especially for individuals exhibiting symptoms related to respiratory diseases.

Health Effects of Indoor Air Pollution

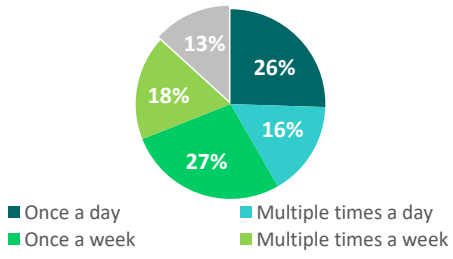
Figure 2. Health Effects of Indoor Air Pollution



Many respondents in the survey consider indoor air quality to be unhealthy, as a large number of them reported complaints of coughing, headaches, as well as nasal, throat, and respiratory irritation. These are among the most common symptoms associated with indoor air pollution. Studies have shown a link between indoor air pollution and low birth weight, tuberculosis, cataracts, and nasopharyngeal cancer. Mild irritation resulting from pollution can cause itching and watering of the eyes, nasal discharge and inflammation, as well as swelling of the sinuses. Other symptoms include eye, nose, and throat irritation, headaches, dizziness, and fatigue. Among the most common symptoms for respondents were recurring headaches (33%), followed by dryness of the eyes and nose (29%), along with nighttime coughing and difficulty breathing (26%, 22% respectively). Despite these symptoms indicating the presence of indoor pollutants, respondents may not realize that the effects of indoor pollution can extend to more serious health problems such as infertility and cardiovascular diseases, leading to premature death.

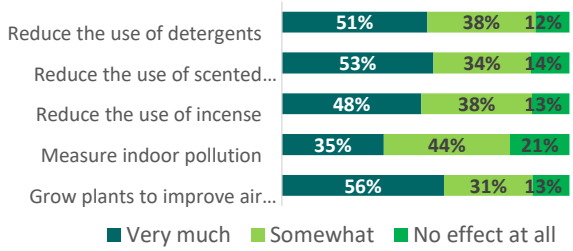
Overall, given the nature of the Gulf Cooperation Council (GCC) countries characterized by high temperatures and poor indoor air quality, indoor environments are easily affected, resulting in significant negative impacts on overall health.

Figure 3: Frequency of using incense inside households



The use of incense and oud in the Gulf is part of the identity, customs, and ancient traditions. As depicted in the above figure, the use of incense is found to be highly extensive. If we divide the respondents into two categories, moderate usage at 13% and extensive usage at 85%, we find that the proportion of extensive incense usage is very high, exceeding the specified level set by the Ministry of Health. Qatar has made tremendous efforts and developed strong policies to manage outdoor emissions, making outdoor pollution potentially less harmful than indoor pollution.

Figure 4: Frequency of using incense inside households



Indoor air quality improvement initiatives should prioritize any activity or program that increases awareness of indoor air pollution as a health risk to individuals. Given that individuals spend most of their time indoors, it is important to identify sources of indoor air pollution and document their concentrations.

On the other hand, at the national level, policies and a proper legislative system that prohibits the import and use of chemically hazardous materials would reduce exposure to indoor air pollutants. Consequently, mandating the use of environmentally friendly materials and practices in the construction sector will be an effective way to reduce indoor air pollutant levels.

Respondents believe that the most effective strategies for reducing indoor air pollution are growing plants that have the ability to absorb pollution and improve air quality (56%), followed by reducing the use of scented candles (53%), detergents (51%), and finally reducing the use of incense (35%).

In conclusion, despite the proven harmful Effects of incense and scented candles on health, the public tends to underestimate their danger due to their association with customs, traditions, and beliefs. This necessitates intensive efforts to raise awareness about their risks and methods of safe usage.

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Policy Recommendations

1. Encouraging growing indoor plants that have air purification properties. This is a cost-effective method that requires no special requirements and can also add aesthetic value, which can have an indirect impact on human health.
2. Encourage more research by governmental and private entities to identify indoor air pollutants and comparing the severity of their health impacts through laboratory studies.
3. Implementing a systematic air conditioner cleaning program in households and using air purifiers suitable for pollutant removal. This includes utilizing air pollution measurement devices and adhering to their results.
4. Classifying incense and scented candles as indoor air pollutants by public health professionals, and developing intensive awareness programs about indoor pollutants in general, with a specific focus on the risks associated with incense and scented candles.
5. Utilizing environmentally friendly materials in the construction sector as an effective mean to reduce indoor air pollutant levels impacted by external environments.