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Quick Response Code:

Correspondence

Infectious disease isolation facility with advanced engineering design: Need of the hour

Sir,

I read with interest the article by Agarwal *et al*[1] on guidance for a dedicated health facility to contain the spread of the COVID-19 outbreak and wanted to seek attention of the authors on the following issues:

The article is of relevance, not only addressing the present health emergency due to the COVID-19 pandemic, but also meeting the continuing/perennial need and looking into the challenges of airborne or respiratory viral infections as well as drug-resistant tuberculosis in the country. Most of the hospitals in India do not have an ideal infectious patient treatment unit to handle the risk of person-to-person transmission. Rather, many hospitals have adopted the concept of rooming infectious wards under the same roof, over the previous trend of treating patients with infectious illness and tuberculosis in stand-alone buildings away from the main hospital premises. The need for creating well-designed communicable disease hospital facility as focused by the authors, has also been highlighted by the International Society for Infectious Diseases, through its guide to infection control in the hospital[2]. The physical design and infrastructure of a hospital or an institution has also been emphasized as an essential component of infection control in the published guidance for building dedicated health facility to contain the spread of the COVID-19 outbreak[3].

The present article has addressed the design of a COVID-19 inpatient facility quite explicitly. However, in the schematic design presented in Figure 1 for an isolation unit, the two halls marked for putting multiple beds are not indicated for air pressure values indicating that these will be of normal atmospheric pressure. If so, it looks like there will be flow of air from these halls to the corridor having -10 mm pressure difference. This creates a possibility of turbulence in the air flow while opening the entry doors of these halls by the healthcare staff, thereby allowing some risk of infection transmission. In addition, there would be an inherent risk of infection to nurses or doctors taking routine care of patients. Will it be useful to build some negative pressure (around -20 or -30 mm) in these halls or is not essential as the risk may be minimal with personal protective equipment (PPE) in practice. This may be of significance as protecting healthcare workers (HCWs) is an important aspect of COVID management. Many HCWs were reported of getting infected in China and Italy during this pandemic and some have also died from the infection[4]. Shortage of PPE or infection in spite of PPE might have been the issues; either way it is a challenge to the healthcare system that can possibly be addressed through improved designing of the treatment units. Besides, staff shortage in healthcare has been observed globally; even in a developed country like the UK, self-isolation of HCWs after exposure in healthcare setting was a challenge to maintain the workforce[5]. Considering the above aspects, my concern aims at limiting transmission to the HCWs to the maximum through engineering solutions, which can overcome the present situations such as PPE inadequacy and maintaining the motivation of health staff by confidence building.

In the design made for a multi-bedded isolation room for suspects in Figure 2, there are two rows of isolation rooms with a corridor in between. While the corridor is indicated with -40 mm air pressure, one row of isolation rooms indicates -20 mm and the other row indicates -60 mm air pressure. This gives an impression that the air from one row of isolation rooms will cross through the corridor to the contralateral or opposite row of isolation rooms. This may allow movement of the infected air from

one row to the other row of the isolation room, creating a possibility of infecting a COVID suspect on isolation who may be a true negative. There is also a concern of cross-infection from COVID-positive patient to non-COVID ones, while using the same corridor for entry and exit into the above unit for COVID suspects. If my apprehension is agreeable by the authors, an improvement may be incorporated into the present design. Further, a little more description to Figures 1 and 2 would have been useful to the readers, as many health professionals might not be well versed to the engineering design. I assume that additional information on this will enhance the applied value of the article to guide the hospital administrators and policymakers in making a change, which is essential to meet the ongoing need, as intended by the authors.

***Conflicts of Interest*:** None.

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