INFORMATION BRIEF (RAPID REVIEW)

REDIROOM

Malaysian Health Technology Assessment Section (MaHTAS)
Medical Development Division
Ministry of Health Malaysia
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Rapid Review
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TITLE: REDIROOM

PURPOSE

To provide brief information on the efficacy/effectiveness, safety, and cost-effectiveness of Redirоom, an instant isolation patient room in preventing healthcare-associated infection (HAI).

BACKGROUND

Healthcare-associated infection (HAI) are acquired from transmissible pathogen in healthcare setting such as hospital-acquired pneumonia, ventilator-associated pneumonia, *SARS-CoV-2* and *Clostridium difficile* infections. Isolating patients with potential or actual transmissible pathogen is among many methods for infection control.[1] Currently, isolation rooms may be either single-occupant rooms or engineered isolation rooms with multiple functions such as negative or positive pressurization.[2]

Redirоom is a temporary, single-patient, isolation room designed to isolate infectious patients under contact or droplet precautions. It provides a physical barrier, as well as high-efficiency particulate absorbing (HEPA) filtration to remove infectious droplets (99.995%) from the air before they return to the ward. It has a slight negative pressure effect where the air from the room exiting through a fan which draws the air through a disposable HEPA filter. Redirоom is contained within a cart that can be wheeled to a patient and assembled by a single person in less than five minutes. The isolation room is also equipped with hands-free entry and integrated personal protective equipment (PPE) station.[2,3]

Figure 1: Redirоom

EVIDENCE SUMMARY

A total of 20 titles were retrieved from the scientific databases such as Medline, EBM Reviews, EMBASE via OVID, PubMed and from general search engines [Google Scholar and US Food and Drug Administration (USFDA)], using the search term; “healthcare associated

infection", "Rediroom", "patient isolation room", and "negative pressure isolation room". Last search was conducted on 26 January 2022. Three articles were found to be relevant and included in this review which comprised of intervention study and cost-effectiveness analysis.

EFFICACY/ EFFECTIVENESS

Mitchell et al. assessed the functionality of Rediroom using a mixed-method approach involving video recordings of clinical activities, interviews with participants, and objective temperature and humidity measurements within a crossover interventional study. The study was conducted in simulated clinical ward environment at Avondale School of Nursing for three days. Thirteen participants (registered nurses and nursing students) completed a range of clinical nursing activities in Rediroom and a control (patient care area of the same size). There were similarities between the Rediroom and the control using a range of measures. The time taken to complete a range of nursing clinical activities in both rooms was broadly consistent. Network analysis of two activities (hoisting a patient and changing a linen) also suggested broad similarities in the movement of nurses in both rooms. Participants described a 'sense of restriction' in Rediroom and they felt the room was not suitable for caring for critically ill patients, for example those in intensive care or requiring cardiac monitoring. The mean temperatures in Rediroom were reported to be higher than in the patient care area when more than two people were present.[4]

Mitchell et al. in another study evaluated the infection control aspects of Rediroom by using three approaches; an assessment against standards or guidelines, professional assessment of installing and dismantling, and a cleaning assessment. Rediroom complied very well with majority of relevant elements contained within the Australasian Health Facility Guidelines and the Department of Health (National Health System, NHS) Infection control in the built environment document. Positive infection control design features were identified, such as smooth cleanable impervious surfaces, efficient design, foot operated doors and excellent seal between the walls and floor. The installation process of Rediroom demonstrated minimal infection control risk as the room was not contaminated after the process. Cleaning assessment using ultraviolet (UV) solution with fluorescent light showed complete removal of the solution from surfaces (96%) and no difficulties in cleaning the surfaces with respect to the stability of Rediroom or force required to clean.[5]

A previous information brief by MaHTAS reported the effectiveness and safety of portable negative pressure isolation ward that was also designed for instant isolation of any patients with suspected or identified infectious diseases. The room is equipped with an air compressor control and HEPA filter that maintains air volume, creating clean and fresh air through the fresh air inlet, and towards the exhaust air outlet. The information brief concluded that clinician performance was not affected either with or without portable negative pressure isolation tent in the lab simulation environment. Negative pressure and HEPA filter are the

requirements for airborne infection isolation rooms (as one of strategies to improve the ventilation).[6]

SAFETY

There was no retrievable evidence on the safety of the Rediroom.

COST-EFFECTIVENESS

Graves et al. evaluated the cost-effectiveness of adopting Rediroom to the current infection prevention efforts of NHS hospital (United Kingdom). The primary outcomes were the expected change to total costs and life years from the NHS perspective. The study modeled potential reduction in HAI cases at 30% on average based on guidelines available on single-patient isolation room. The mean expected cost of implementing Rediroom per 100,000 occupied-day beds in an NHS hospital was £1,545,949 (RM 8,776,229), the mean change to total costs was expected to be £1,073,645 (RM 6,094,997), and the mean change to life year gained (LYG) was expected to be £184 (RM 1045). The mean expected incremental cost per LYG was £5,829 (RM 33,090). The probability that adoption was cost effective against a £20,000 threshold per additional LYG was 93%, and for £13,000 this was reduced to 87%. Despite uncertainties about the effectiveness of Rediroom for reducing risks of HAI, this study supplied some evidence that an adoption decision was likely to be cost-effective for the NHS setting.[7]

CONCLUSION

There was very limited evidence to suggest the effectiveness and safety of Rediroom as an instant isolation room for patients with suspected or identified infectious diseases. Studies conducted in simulation ward demonstrated that Rediroom may has the potential in reducing the risks of HAI in hospital setting. Nevertheless, study on the effectiveness of Rediroom in a real-world setting would be useful for further assessment and consideration.

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