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**Background**

Tertiary healthcare has been increasingly demanded by patients nowadays due to the need for medical specialties in managing complex cases that cannot be managed by primary care physicians in the clinic settings. Some cases required hospitalisation for investigation and treatment before they can be discharged home and back to their family doctors. In order to cope with the demand for tertiary care services and medical care, the health system continue to improve its way of delivering and providing services. The establishment of telemedicine or remote consultation may have an advantage for the patient in terms of accessibility to medical care. However, the advancement of technology in the healthcare system such as telemedicine has brought up concerns about the potential for clinical risk and/or patient or staff unacceptability as well as the technological, logistical and regulatory difficulties in adopting the services. Few others might also fear that the use of technology in the healthcare settings is a threat to their healthcare workers, especially for those who have poor digital literacy. For that reason, there is a need to have an assessment of the effectiveness and safety of virtual online consultations between patients and doctors in tertiary care. This technology review was requested by a Consultant General Medicine from the Department of Medicine, Hospital Serdang to review the evidence on tertiary care virtual online consultation between doctor and patient to assist in the development of guidelines and regulations with regards to virtual consultation services available in Malaysia.

**Objective**

To assess the effectiveness, safety and economic implication of tertiary care virtual online consultation between doctor and patient to be used in Ministry of Health (MOH) facilities.

**Methods**

The following electronic databases were searched through the Ovid interface: MEDLINE (R) ALL 1946 to November 1, 2022, EBM Reviews-Cochrane Database of Systematic Reviews (2005 to November 2022), EBM Reviews-Cochrane Central Register of Controlled Trials (November 2022), EBM Reviews-Health Technology Assessment (4th Quarter 2016), NHS Economic Evaluation Database (1st Quarter 2016) and PubMed. Additional articles were retrieved from reviewing the bibliographies of retrieved articles. The search was limited to articles on human. There was no language limitation in the search. The last search was conducted on 30 November 2022.

**Results and conclusion:**

**Effectiveness**

There was limited evidence with mixed findings favouring and not favouring the intervention. The findings showed that a higher proportion of patients were able to be covered for surveillance and adhered to follow-up or treatment in virtual consultation groups descriptively, but no inferential statistics were performed for the above results. Therefore, the difference may not be significant between both groups. In terms of patient outcome, most evidence reported that virtual online consultation had similar findings and results with the control groups when assessing these two outcomes. There was also a fair level of evidence that reported the effect of virtual online consultation in tertiary care for the attendance rate, re-hospitalisation and quality of life. There were mixed findings for the outcomes assessed in this review suggesting that no definitive conclusion can be made on the

effectiveness of the intervention compared with the control group. However, the evidence showed that virtual online consultation improved patients' adherence to treatment compared with control groups.

### **Safety**

There was limited evidence with one study showed no significant difference in death rate between the intervention and control group. No conclusion was able to be derived from this review.

### **Economic implication**

There was limited evidence with mixed evidence on whether the cost of setting up the virtual online consultation would cost less than the cost of traditional face-to-face consultation. Several factors such as the model of the equipment and the type of software used as well as the cost needed to train the personnel or patient need to be considered as well.

### **Organisational issues**

There was fair level of retrievable evidence in this review. The findings showed that the major issue and main concerns of using virtual online consultation in tertiary care settings is regarding the technical issue and setting up the facilities either in the hospital, clinics or patient's home e.g. cost, type and quality of the equipment needed for virtual online consultation. Other than that, the unavailability of the services, training of health personnel and user as well as physician licensing for virtual consultation and reimbursement also affected the usage and uptake of the health technology which may need to be considered in the future.

### **Social/ Ethical / Legal**

There was fair level of evidence on the social aspects of virtual online consultations in tertiary care settings between doctor and patient. Overall, the majority of the patients and health providers were satisfied with the virtual online consultation and most findings were statistically significant favouring the intervention group. Only one study showed patients were able to save more time when receiving the consultation online compared with in-person visits. However, barriers to virtual online consultation need to be taken into consideration as well. The evidence showed that digital and health literacy of the patients who intended to use the services determined the uptake of virtual online consultation. Patient confidentiality during the consultation was also highlighted as one of the issues for this health technology.

### **Summary**

The available evidence of virtual online consultation between doctors and patients in tertiary care settings is inconclusive on the effectiveness of the intervention in terms of patient outcomes. The population and the settings reviewed were varied and heterogeneous. However, it may improve patient satisfaction and adherence to treatment, and reduce patient's time attending appointments or follow-up with clinicians. It may also help to reduce the cost, but this depends on several factors such as the cost of equipment used, purchasing of the software, internet data charges, connectivity and coverage and patient's residency. Many aspects, especially the barriers and challenges to virtual online consultation need to be taken into consideration to ensure its usability and acceptance as a new method of providing medical care to patients.