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The effectiveness of telemedicine consultation and the elimination of congestion in hospitals: A systematic review

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Abstract---Telemedicine can be used in a variety of ways to help hospitals alleviate overcrowding and to reduce high usage of acute care medical resources in hospital settings. None of the interventions reviewed here is mutually exclusive; appropriately, many of them can be used at the same time. It is possible for hospitals to implement a triaging protocol that directs less critical patients to telemedicine. However, the effectiveness of the intervention is limited. In order to be effective, telemedicine must be constructed to fit into broader, existing healthcare systems, and healthcare providers must be trained in how to use and integrate the telemedicine system into their procedures. Given most people's lack of familiarity with telemedicine, as well as a reluctance among the older population to use telemedicine, communities must be reached and patients must be educated about how to use telemedicine. Case studies suggest that telemedicine services in rural areas should strive to meet in person with the patient in order to build confidence in the system before they are used.

Keywords---telemedicine consultation, healthcare systems, hospitals.

1. Introduction to Telemedicine and Hospital Congestion

The term telemedicine is defined as every form of incorporated healthcare conveyance at a distance, which results in lawful and incorporeal ownership of healthcare. One such method of telemedicine is teleconsultations - consultations conducted remotely without the necessity of a hospital visit. This approach is growing substantially, and we are currently seeing a shift in the management of patients towards a more distanced healthcare delivery in specific areas due to the pandemic. What prompted this shift is the fact that the increase in hospital visits is but one of the factors that has contributed to hospitals requiring a need to extend their services. Thus, to the completely new remote service, where teleconsultation is mandatory as a first point of contact, in order to limit the pool of patients that have to be physically present at the hospital, not only as a

potential solution for protection, but as an overflow. The curative demand is primarily achieved, which lowers the congestion risk.

Hospital congestion is one of the main challenges that healthcare is facing, causing both hospitals and patients numerous difficulties. This congestion directly threatens bed availability and patient safety. The chronic congestion and the increase in patients who need assessment and treatment have led many hospitals to experience an increase in waiting time for medical evaluation in emergency room care. There is no consensus on the definition of an overcrowded emergency department; however, it is generally defined as a situation in which the need for immediate medical evaluation is greater than the availability to perform such. At many hospitals around the world, around 20% of the patients are admitted with the help of an Emergency Department. A similar percentage of these patients is admitted after they consult an outpatient clinic. Studies have shown that telemedicine reduces congestion by up to 20%. The number of nursing homes has also increased significantly, and this patient group is greatly helped by teleconsultation. In 2018, there were 20,480 nursing homes in the Netherlands, with 189,000 available places, and around 120,000 residents. The implementation of integrated care added thirty new entries with a one-and-a-half nurse addition. Of the 100 selected countries, based on the success of the technology industry and the availability of high-quality innovative healthcare, the Netherlands ended up in 5th place in the Technological Readiness Ranking. We are in the top 4% of the most effective healthcare countries. In the Netherlands, the telehealth structure is being directly implemented by regional administrators. Moreover, the common conclusions arise from methodological limitations and differences in scope and design. Telemedicine can have great promise to eliminate hospital visits and thus alleviate hospital congestion. There is increasing evidence regarding its effectiveness. The current systematic review aimed to evaluate this for teleconsultations.

2. Methodologies and Study Designs in Telemedicine Research

Telemedicine was developed to manage patients in remote locations more effectively in order to reduce inequalities in access to health care. Five commonly used methodologies are found in the literature. They vary in their robustness of design and generalizability. Before results are evaluated, we need to know whether the study design is appropriate to evaluate the system of research. The effectiveness of a telemedicine service should be evaluated by the process of the consultation, the diagnosis given, the effectiveness of the treatment, and the cost implications to the patient and service. Study designs used to evaluate the effectiveness of telemedicine consultation include: randomized controlled trials, where all patients receive both forms of consultation; cohort studies when it is not ethical to randomize care; qualitative analysis of the consultation; and single-blind studies.

Studies have been overwhelmingly based on numerical data collection using questionnaires and surveys. Poor reporting may result in a publication bias that may lead to a false conclusion of the effectiveness of a telemedicine consultation. The advantages and disadvantages of these methodologies are discussed, as are the ethical implications of collecting patient data or changing consultation

medium. The ethical requirements of the study designs should be in line with the recommendations of the Helsinki Mandate. Informed consent is necessary in research studies, although it is often assumed that patients are informed rather than actually obtaining informed consent. This review concentrates on aspects that involve patients and deals with the expectations of the service from those patients. The methods of data collection of 'pilot' schemes in each phase are described in detail. Information was collected in a variety of ways using surveys on patient satisfaction. Data were collected from healthcare professionals using qualitative data collection methods. A wide variety of different research methods are used within this field to evaluate the effectiveness of telemedicine consultation. (Knapp et al.2021)(Eze et al., 2020)

3. Findings on the Effectiveness of Telemedicine in Hospital Settings

Data synthesis: Telemedicine consultations show equivalent or superior patient outcomes when compared to traditional in-person consultations. These outcomes include improved access to care, improved patient satisfaction, as well as cost and time savings. In contrast with in-person consultations, virtual clinics have dissimilar infrastructure requirements at government, hospital, and individual specialist levels, resulting in different patient and healthcare professional experiences. Experience with one type of telemedicine consultation may cross over to other telemedicine consultations. Current research has been largely conducted in the setting of remote monitoring, delegation consults, direct patient consults, or specialist consults and may not be applicable to other telemedicine use cases. Several different models of telemedicine have been studied, such as tele-hospitalist and tele-ICU models. Better-designed prospective studies are needed and should include larger sample sizes, a longer duration, and more robust outcomes. (Ackerman et al.2020)(Mauro et al.2020)

Conclusion: Telemedicine offers an alternative to traditional in-person consultations for the delivery of hospital care. Current work consistently highlights the benefits of telemedicine in terms of cost and time savings, improvements in access to care, enhanced patient satisfaction, and acceptable clinical outcomes. This systematic review adds to the growing body of evidence that telemedicine is a legitimate and effective means of healthcare delivery and supports the investment in telemedicine programs. More prospective research is required to specifically write guidelines for the use of telemedicine in the current growing crisis.

4. Strategies for Using Telemedicine to Reduce Hospital Congestion

Telemedicine can be used in a variety of ways to help hospitals alleviate overcrowding and to reduce high usage of acute care medical resources in hospital settings. None of the interventions reviewed here is mutually exclusive; appropriately, many of them can be used at the same time.

It is possible for hospitals to implement a triaging protocol that directs less critical patients to telemedicine. However, the effectiveness of the intervention is limited. In order to be effective, telemedicine must be constructed to fit into broader, existing healthcare systems, and healthcare providers must be trained in

how to use and integrate the telemedicine system into their procedures. Given most people's lack of familiarity with telemedicine, as well as a reluctance among the older population to use telemedicine, communities must be reached and patients must be educated about how to use telemedicine. Case studies suggest that telemedicine services in rural areas should strive to meet in person with the patient in order to build confidence in the system before they are used. Data about the effectiveness and viability of telemedicine for minor care, specialist, or nursing consultations does not exist. (Wang et al., 2020)(Tsou et al.2021)

Policy concerning telemedicine should reflect innovative regulatory ideas that facilitate the entrance and growth of telemedicine into the healthcare and lay worlds. Encouraging cooperation between healthcare providers and telemedicine companies will be most effective when based on clear understandings of how technology might improve the quality of care provided by primary healthcare professionals and how it should be used. Policy in relation to telehealth issues should best be crafted in advance of widespread roll-out. However, there are opportunities to change policy after implementation, and any changes made after the fact should strive to reflect the four priorities of safety, efficacy, efficiency, and equity. Telemedicine can be used in a variety of ways to help hospitals alleviate overcrowding and reduce high usage of acute care medical resources in hospital settings.

5. Challenges and Future Directions in Telemedicine Implementation

Lack of institutional flexibility has always been a significant challenge in the telemedicine implementation process. Existing health systems block attempts to implement telemedicine on a large scale because telemedicine requires special technical conditions for access to data and treatment of renewable human resources to be available on a 24/7 basis. As this is not always the case, the benefits of telemedicine cannot be achieved. The comparative technical evaluation results highlighted frequent telemedicine problems such as poor audio and video quality. This was the main reason for the refusal of patients and professionals to adopt the technology. Technical problems can be attributed to aging technology. A range of options is available to rectify the above deficiencies. For video conferencing, the number of IP, ISDN, and analogue point connections has grown dramatically; the choices have become cheaper. Another trend is the increasing number of access points that connect to the Internet mainly over Universal Serial Bus. The technology is constantly changing. (Ftouni et al.2021)(Al-Samarraie et al.2020)

Issues such as inconsistent reimbursement policy, lack of equivalent permission, proprietary media formats, privacy of patient and physician data, licensing, and corporate liability restrictions must be perfected in order to make telemedicine easier to follow. Telemedicine can be better utilized for examinations, consultations, and monitoring. Illegally practicing non-consensual medical functions can cause physical harm to the beneficiaries. Absence from physical examination does not give telemedicine the right to practice illegal medicine. The best option is generally to work within the law, adjusting telemedicine applications to existing medical licenses. Most future telemedicine initiatives could be addressed by enhancing technology, building in low-income rural

communities, and improving research to protect the person and answer the legal policy community. As more countries approve telemedicine, research directions move away from proving fairness and effectiveness at the local level towards the study of technological changes that exacerbate existing products for telemarketing. Further research still needs several priority areas of the telemedicine factor, ranging from technology services to research into emergency telemedicine. In addition, telemedicine algorithms that exploit expert systems, neural networks, and interactive computer-based telemedicine now need to be researched. However, we work to help researchers in these areas to improve the effectiveness and fairness of telemedicine provision. Collaboration continues with all stakeholders at every level: healthcare institutions and policymakers, to help champion this study. Do not forget that with the appropriate partnerships, conditions are currently being determined so that these technologies can be freely applied worldwide.

References

- Ackerman, S. L., Gleason, N., & Shipman, S. A. (2020). Comparing patients' experiences with electronic and traditional consultation: results from a multisite survey. *Journal of General Internal Medicine*, 35, 1135-1142. [springer.com](https://www.springer.com)
- Al-Samarraie, H., Ghazal, S., Alzahrani, A. I., & Moody, L. (2020). Telemedicine in Middle Eastern countries: Progress, barriers, and policy recommendations. *International journal of medical informatics*, 141, 104232. [coventry.ac.uk](https://www.coventry.ac.uk)
- Eze, N. D., Mateus, C., & Cravo Oliveira Hashiguchi, T. (2020). Telemedicine in the OECD: an umbrella review of clinical and cost-effectiveness, patient experience and implementation. *PloS one*. [plos.org](https://www.plos.org)
- Ftouni, R., AlJardali, B., Hamdanieh, M., Ftouni, L., & Salem, N. (2021). Challenges of telemedicine during the COVID-19 pandemic: a systematic review. *BMC medical informatics and decision making*, 22(1), 207. [springer.com](https://www.springer.com)
- Knapp, A., Harst, L., Hager, S., Schmitt, J., & Scheibe, M. (2021). Use of patient-reported outcome measures and patient-reported experience measures within evaluation studies of telemedicine applications: systematic review. *Journal of medical Internet research*, 23(11), e30042. [jmir.org](https://www.jmir.org)
- Mauro, E., Marciano, S., Torres, M. C., Roca, J. D., Novillo, A. L., & Gadano, A. (2020). Telemedicine improves access to hepatology consultation with high patient satisfaction. *Journal of Clinical and Experimental Hepatology*, 10(6), 555-562. [nih.gov](https://www.nih.gov)
- Tsou, C., Robinson, S., Boyd, J., Jamieson, A., Blakeman, R., Yeung, J., ... & Hendrie, D. (2021). Effectiveness of telehealth in rural and remote emergency departments: systematic review. *Journal of Medical Internet Research*, 23(11), e30632. [jmir.org](https://www.jmir.org)
- Wang, C. J., Liu, T. T., Car, J., & Zuckerman, B. (2020). Design, adoption, implementation, scalability, and sustainability of telehealth programs. *Pediatric Clinics*. [HTML]