TELEMEDICINE PAYMENT SYSTEM BASED ON QUALITY: A SCOPING REVIEW

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Abstract
Telemedicine has been proven to improve access to care. However, it is still not sure how a payment system can accommodate high-quality telemedicine services. This paper aims to study the available payment system to accommodate telemedicine with a focus on health services quality. We conducted a scoping review of the telemedicine payment system and telemedicine quality through the PubMed and CINAHL databases including primary research, literature reviews, and expert opinion, aside from policy documents. The number of records identified through the database was 286. In addition, 195 were screened after removing duplicates, and 28 papers were included in the review after meeting the inclusion criteria. From a close look, it is concluded that, in its vast options of care, telemedicine practice can be tailored to payment systems that can be accommodated to quality. According to our review, the type of payment model used to fund telemedicine services could either bolster or hinder quality improvement, depending on the setting. Furthermore, concerns such as lack of standard reimbursement policy and privacy concerns need to be mitigated early to accommodate the integration of telemedicine into the existing payment system.

Keywords: telemedicine, payment system, quality assurance in healthcare, reimbursement

Abstrak

Kata kunci: telemedisin, sistem pembayaran, jaminan mutu pelayanan kesehatan, reimbursement
INTRODUCTION

The Coronavirus disease (COVID-19) pandemic has changed the delivery of healthcare services globally. Public health measures including lockdown and social distancing has been done to slow down the spread of the virus (Lau et al., 2020). Face-to-face contact between patients and health care professionals is also disrupted. Many countries are turning to telemedicine to address this issue and also fill the gap in the health system.

According to the World Health Organization (WHO), telemedicine is defined as “The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies (ICT) for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities.” (World Health Organization, 1998). Furthermore, telemedicine has multifaceted services, including remote assistance (teleconsultations and telemonitoring), administrative management of patients, distance learning for professionals, and collaborative research networks (Pan American Health Organization, 2016). What classifies as telemedicine services was stated by Hersh et al. in 2006, including store and forward images (teleradiology, tele-electrocardiography, tele-ultrasonography, and clinical teleconsultation (Kementerian Kesehatan Republik Indonesia, 2019). While the Health Minister Regulation only covers telemedicine performed between healthcare facilities, during the COVID-19 pandemic, Indonesia’s minister of health enacted Health Minister Decree No. HK.01.07/MENKES/4829/2021 regarding Guidelines for Health Services Through Telemedicine During the Corona Virus Disease Pandemic 2019 (COVID-19) that recommends telemedicine services between healthcare workers and patients. This decree specifies that the telemedicine services that can be administered during COVID-19 pandemic, including consultation, information, and education, clinical consultation, laboratory examination, and tele-pharmacy (Kementerian Kesehatan Republik Indonesia, 2021).

Evidence of the effectiveness of telemedicine varies in the literature. A review of reviews found that certain type of telemedicine intervention is therapeutically effective, while the other publications suggest that it is promising but needs further research (Ekeland et al., 2010). For example, a study on internet-based cognitive-behavioral therapy with therapist support stated that it is effective for the management of anxiety symptoms (SPEK et al., 2007). Another review suggested that the usage of telemedicine networks can improve the delivery of tissue plasminogen activator (tPA) for stroke patients in terms of reduced time of patient transfer and speeding up assessment (Wu and Langhorne, 2006). On the other hand, other research in the review by Ekeland et al., stated that although telemedicine is found to be feasible and acceptable in diabetes care, the evidence of clinical improvement of diabetes patients is weak (Ekeland et al., 2010).

In Indonesia, telemedicine service is regulated in Health Minister Regulation No. 20 year 2019 about the Implementation of Telemedicine Service Between Health Care Facilities, which serves as the legal umbrella of implementation for the service. What is included as telemedicine services according to this regulation are teleradiology, tele-electrocardiography, tele-ultrasonography, and clinical teleconsultation (Kementerian Kesehatan Republik Indonesia, 2019). While the Health Minister Regulation only covers telemedicine performed between healthcare facilities, during the COVID-19 pandemic, Indonesia’s minister of health enacted Health Minister Decree No. HK.01.07/MENKES/4829/2021 regarding Guidelines for Health Services Through Telemedicine During the Corona Virus Disease Pandemic 2019 (COVID-19) that recommends telemedicine services between healthcare workers and patients. This decree specifies that the telemedicine services that can be administered during COVID-19 pandemic, including consultation, information, and education, clinical consultation, laboratory examination, and tele-pharmacy (Kementerian Kesehatan Republik Indonesia, 2021).

From an analysis conducted by the Centers for Disease Control and Prevention (CDC), in the United States alone there was 50% rise in the number of telemedicine visit in the first three months of 2020 compared to the same period in 2019 (Koonin et al., 2020). The recent significant increase in telemedicine administration raises a question on its sustainability, not only during COVID-19
pandemic but beyond. The sustainability of telemedicine services depends on how we manage challenges surrounding the implementation of telemedicine. Furthermore, several aspects of healthcare quality become a concern in telemedicine service delivery. The digital divide, as one of the most prominent challenges in any digital health intervention, is also a threat to telemedicine quality, especially regarding equity (Eberly et al., 2020).

As with other types of health service, the quality of telemedicine must also be assured. Quality assurance itself is defined as “all actions taken to establish, protect, promote, and improve the quality of health care” (Donabedian, 2002). According to Donabedian in 1990, there are seven pillars of quality in health care: efficacy, effectiveness, efficiency, acceptability, optimality, legitimacy, and equity (Donabedian, 1990). In Indonesia, quality assurance itself is an integrated aspect of National Health Insurance. According to Law No. 40 year 2004 on National Social Security System, Social Security Administrator for Health (BPJS Kesehatan) is able to develop a service quality assurance system (Undang-Undang Republik Indonesia Nomor 40 Tahun 2004 tentang Sistem Jaminan Sosial Nasional, 2004). Moreover, performance-based payment is stated as a strategy to assure quality in the Regulation of the Social Security Administrator for Health.

On the other note, the payment system as an essential component of health service is intended to achieve a greater goal than just paying for services cost. Economic signals made by the payment system could facilitate accountability procedures between purchasers and providers that can affect how health services are managed and delivered. The payment system could be divided into payment by the patient, payment by the patient with reimbursement, and payment through an intermediate provider payment arrangement. Different types of these payment systems can affect providers and patients behavior. (Langenbrunner et al., 2009)

Institute of Medicine (US) Committee on Quality of Health Care in America suggested that many current payment systems could be adjusted to bolster quality improvement. There are several principles that can make sure payment methods rewards high-quality care, including (1) Providing adequate payment for good clinical management of patients, (2) Making sure providers have the opportunity to share in the benefits of quality improvement, (3) Providing consumers and purchasers to perceive information about the difference in care quality, (4) Financially rewarding care that based on best practice and achieved better outcomes, and (5) Reducing fragmentation of care. (Institute of Medicine (US) Committee on Quality of Health Care in America., 2001) Based on the notion from the Institute of Medicine that various payment model could be adapted to improve quality, this review aim to map the comprehensive evidence on the types of payment system available for telemedicine services and its relation to quality.

**METHODS**

We chose scoping review as our research methods because our objective is to present general concepts of the issue. This method was also selected because it allows us to get perspectives from many types of publications and study. This research was done based on scoping review framework of Joanna Briggs Institute (JBI) (Peters et al., 2017).

Two research question was raised based on Population, Concept and Context (PCC) elements. Inclusion criteria were publication describing about payment system for any type of telemedicine service, telemedicine quality, full-text available, and written in English or Indonesia. All primary research, systematic review, scoping review, guidelines, expert opinion, and policy documents were included.

Initially, a limited search was performed and text words contained in the title and abstract were analyzed to identify appropriate keywords for this study search strategy. Furthermore, a full search on Pubmed and CINAHL database was done to retrieve published literature. The search was conducted from March to September 2021. The keywords used for this strategy were telemedicine, telehealth, payment, reimbursement, quality, and ‘quality indicator’. Search strategies are provided in table 1.
Table 1. Search Strategies

<table>
<thead>
<tr>
<th>Library</th>
<th>Search Queries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pubmed</td>
<td>(telemedicine[Title/Abstract] OR telehealth[Title/Abstract]) AND (quality[Title/Abstract] OR &quot;quality indicator&quot; [Title/Abstract]) AND (payment[Title/Abstract] OR reimbursement [Title/Abstract])</td>
</tr>
<tr>
<td>cinahl</td>
<td>TI (telemedicine OR telehealth) AND TI (quality OR &quot;quality indicator&quot;) AND TI (payment OR reimbursement)</td>
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<tr>
<td>cinahl</td>
<td>AB (telemedicine OR telehealth) AND AB (quality OR &quot;quality indicator&quot;) AND AB (payment OR reimbursement)</td>
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</table>

The PRISMA flow diagram was used for the data collection process. Duplicates were excluded before reviewing the abstracts. The search results were then assessed according to the inclusion and exclusion criteria. All abstracts that discuss some extent of telemedicine payment system and telemedicine quality were included for further evaluation of full-text records. Furthermore, the full-text publications are then assessed for eligibility before deciding the final studies included in this review. In the last step, a data charting form was used to extract the data and arranged it according to the theme related to payment types and quality indicator mentioned.

RESULT

Initially, 286 records were identified (Pubmed 191; CINAHL 95). After going through process of screening and review, 28 studies were chosen. This process is reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram (Figure 1).
The findings of included studies were summarized in Table 2. From the charting process, we found that most of the records mentioned about limited reimbursement (53.6%), others about alternative payment models (17.8%), fee-for-service (10.7%), global budget (3.6%), and 14.3% about unspecified payment system.

In this paper, telemedicine services identified through the review including teleconsultation, remote monitoring, teleradiology, tele-ICU, teledermatology, telepsychiatry, tele-rehabilitation, robotic telemedicine, telestroke, telebehavioural health, and telemedicine for outpatient services.

An element is considered as a quality indicator if it was mentioned in one of the three evaluation frameworks of telemedicine: Framework for the Implementation of a Telemedicine Service (Pan American Health Organization, 2016), Creating a Framework to Support Measure Development for Telehealth (Hollander et al., 2017), or Defining Evaluation Indicators for Telemedicine as a Tool for Reducing Health Inequities (Novillo-Ortiz, 2016). We then grouped the element according to Donabedian's Seven Pillars of Quality in Healthcare, indicators found in the literature including acceptability, efficiency, efficacy, efficiency and equity. We could not find any literature mentioning legitimacy and optimality in our research.

### Table 2. Type of payment system available for telemedicine and its effect on quality

<table>
<thead>
<tr>
<th>Type of Payment System</th>
<th>Quality indicator</th>
<th>Healthcare services</th>
<th>References</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited or lack of reimbursemen t</td>
<td>Acceptability, efficiency</td>
<td>Teleradiology, robotic telemedicine, tele-ICU, teledermatology, remote monitoring, telepsychiatry, tele-rehabilitation</td>
<td>(Ashrafzadeh and Hamdy, 2019; Coates et al., 2015; Cowan et al., 2019; Elliott and Shih, 2019; Guzik et al., 2021; Hassan et al., 2018; Kruklitis et al., 2014; Phuphanich et al., 2021; Ricci et al., 2017; Rogove et al., 2012; Sable, 2001; Sisk et al., 2020; Uscher-Pines and Kahn, 2014; Wang et al., 2020; Yu et al.,)</td>
<td>- Although not reimbursed, providers can reduce overall service cost</td>
<td>- Limited or lack of reimbursement is a factor of low acceptability of telemedicine program for patients and doctors - If telemedicine is not covered under insurance, acceptability of patient is low - Efficiency is decreased</td>
</tr>
<tr>
<td>Alternative payment model</td>
<td>equity, acceptability, efficiency</td>
<td>Telemedicine in patient-centered medical home (PCMH), teleconsultation, remote patient monitoring</td>
<td>2020)</td>
<td>in some telemedicine services because it cause more follow-up appointments</td>
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<td></td>
<td>-</td>
<td>- The payment system facilitates continuity of care and encourage financial incentives for providers for achieving certain quality benchmarks; thus incentivise providers to give better service quality.</td>
<td>-</td>
<td>- Success of the adaptation of the telemedicine technology is greatly depending on the organization’s or provider’s capability to integrate it to the current service.</td>
<td></td>
</tr>
</tbody>
</table>

- Can optimize resource utilization.
- Providers participating in bundle payment risk arrangement were more likely to adopt telemedicine services due to economic efficiencies.
- Telemedicine as an additional service bolstered by.
| Fee-for-service | Acceptability, equity | Telestroke, telebehavioural health, telemedicine for outpatient | (Harvey et al., 2019; Schoebel et al., 2021; Tracy et al., 2008) | APM could increase efficiency and availability of services. Telemedicine service could decrease rate of hospitalization. Store-and-forward telemedicine offers timely access to health services in a provider-shortages setting. When telemedicine is reimbursed the same rate as face-to-face services, there are higher adoption of telemedicine service by practitioners and acceptability by patient. - Concern for overutilization. |
| Global budget | Efficacy, efficiency | Tele-ICU | (Franklin, 2018) | The payment model incentivised when an innovation achieve cost, health outcomes, and patient experience target. No disadvantages mentioned on the literature. |
| Unspecified type | Equity, acceptability | Remote patient monitoring, | (Gaziel-Yablowitz et | Performance-based | Geographical |
| telestroke       | al., 2021; Hall Dykgraaf et al., 2021; Straub et al., 2006; Vo et al., 2015) | system used tiered incentives model for provider to encourage utilization of telemedicine - Geographic restriction in telemedicine reimbursement policies does not incentivize rural hospital in adopting telemedicine services, causing lower accessibility of care - Practice Incentive Program Quality Improvement (PIPQI) payment scheme: incentive for participation in quality improvement activities - Telestroke is found to reduce mortality and lower cost, but initial investment is still a burden for rural hospital | restriction in telemedicine reimbursement policies does not incentivize rural hospital in adopting telemedicine services, causing lower accessibility of care |
DISCUSSION

Overall, this review map 28 studies that describe about telemedicine payment system and telemedicine quality, including quantitative and qualitative studies, expert opinions, and guidelines. Not many publications primarily explore the correlation of certain payment system towards quality improvements in telemedicine. Studies in this review mainly stipulated that a particular type of payment system could affect certain elements of telemedicine service quality. Many of the studies still focus more on utilization and provider acceptance, but not detailed how the quality of telemedicine is directly affected by the payment model. This is critical so that while telemedicine practice, within the service that is public-orientated (i.e., within the National Health Insurance), can be deemed sustainable, it would not alter the quality of healthcare given. However, despite the need in general, this research highlights that even though there was a rapid growth of telemedicine development during the period of COVID-19 pandemic, the payment system and its influence on quality is still under-explored.

The main theme in the literature regarding telemedicine payment systems focused on how telemedicine services were not reimbursed in many settings. A survey of telemedicine users describes how limited reimbursement is a significant barrier to adopting telemedicine innovation (Rogove et al., 2012). Adoption is an important indicator in the early stage of telemedicine development according to PAHO’s Defining Evaluation Indicators for Telemedicine as a Tool for Reducing Health Inequities (Novillo-Ortiz, 2016). Furthermore, when telemedicine is not covered by an insurance scheme, there is lower acceptability by patients because they have to pay for the service out-of-pocket (Yu et al., 2020). Interprofessional stroke e-consult is one of the services that is not substantially reimbursed by Medicare in the United States, making low provider utilization, while the service has the potential to improve the efficacy of care with timely diagnosis and decrease the exposure of COVID-19 during the pandemic (Guzik et al., 2021). On the other hand, although with lack of reimbursement, provider somehow can achieve cost-saving due to the efficiency of the telemedicine service and its impact towards the reduction of per-case expenditure (Kruklitis et al., 2014).

Alternative payment models, including Accountable Care Organizations (ACOs), bundled payment, and other types of value-based payments, are promising in facilitating quality improvement in telemedicine services. It is known that a value-based model could encourage the adoption of health innovation and provides an incentive for reaching quality goals. Moreover, economic efficiency in terms of usage of specialist resources is encouraged by this payment model (Zhao et al., 2020). Furthermore, this type of payment system is believed to facilitate cost-saving in the short and long term (Gillespie et al., 2019). Telemedicine is also expected to be supported by alternative payment model in case of achieving continuity of care in managing chronic illnesses (Hughes et al., 2011).

Regarding fee-for-service payment, in a study we identified about payment parity between telemedicine and face-to-face services, it stated that acceptance of telemedicine depends on where it is administered, if it is done in a place with parity law, meaning telemedicine is reimbursed at the same rate as in-person care, then the acceptance is better (Harvey et al., 2019). On the other hand, a publication by Tracy et al., stated that home telehealth that is currently paid by a prospective payment system is lacking in reimbursement, while it has the opportunity to improve clinical outcomes, safety, quality and cost saving of care. According to the study, service reimbursement of home telehealth is important to reduce unnecessary rehospitalization, visits to the emergency room and at the end ease health care burden to allow more access for patients who really need the care (Tracy et al., 2008).

In a global budget revenue model in Maryland, United States, a system was made to incentivize the providers when cost, quality, and patient experience targets are met. This type of system is also have some degree of impact towards health outcomes and the acceptability of providers (Franklin, 2018).

Several studies mentioned payment systems that could not be categorized into the types above. A system was developed to
incentivise provider in accepting and utilizing integrated telemedicine in a tiered fashion that stemmed from the Meaningful Use program of the US healthcare system that gives incentive for adopting electronic health records (EHR) (Vo et al., 2015). In another study, a model in Australia administered during lockdown provides a financial incentive for providers who still keep the in-person practice open besides giving telemedicine services (Hall Dykgraaf et al., 2021). This particular model is especially interesting because one of the challenges in telemedicine implementation is over-utilization, making this type of incentive potentially regulates this kind of challenge.

Additionally, during our review, we found that there are other concerns surrounding telemedicine practice and quality. Several literatures discussed fragmented regulations, such as the need for out-of-state licensing and varied reimbursement policies between regions, causing practitioners’ inability to provide telemedicine services to patients from other regions (de Bustos et al., 2009; Rogove et al., 2012; Rojahn et al., 2016). While acquiring multi-state licensure is costly and arduous, regulatory issues like these can hinder potential quality improvement made by telemedicine implementation, particularly in addressing provider shortage and extending patient access (Guzik et al., 2021; Tracy et al., 2008). Another concern found in the literature is privacy issue. Privacy of patient information is considered as a key element to safety by Deslich et al., while providers and policy makers in Germany expressed that patients’ information protection concern is one of the barriers for the implementation of telemedicine (Deslich et al., 2013; Rojahn et al., 2016). These issues need to be regulated carefully to enable better integration of telemedicine into the current system.

This review found mainly publications from the US and other high-income countries. The applicability of our findings in low-middle income countries like Indonesia still needs further investigation. We believe that with the increasing utilization of telemedicine in the world, more research regarding its quality and the payment system is going to increase.

This study has several limitations, including only identified articles published in two libraries (Pubmed and CINAHL) and did not include unpublished literature from other sources. Moreover, backward and forward search was not done, so there may be other records unidentified.

CONCLUSION

From close look, it is concluded that, in its vast options of care, telemedicine practice can be tailored to payment systems that can incentivize quality of care achievement. It is worth mentioning that there is no one-size-fits-all payment system to increase the quality of telemedicine administration. When implementing payment system to accommodate telemedicine, countries need to adopt one that tailors to the contextual needs and health financing scheme of the country. According to our review, the type of payment model used to fund telemedicine services could either bolster or hinder quality improvement, depending on the context and setting. However, many literature still concentrated on adoption and utilization of telemedicine in regards to the payment model and not clearly focused on how certain payment mechanism affect telemedicine service quality. Furthermore, concerns such as lack of standard reimbursement policy and privacy concerns need to be mitigated early to accommodate the integration of telemedicine into the existing payment system. In the future, there needs more studies that can explore the intricacy between breadth of telemedicine services offered and ideal provider payment type, particularly one that is contextually relevant to country’s healthcare landscape.

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