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Telemedicine: Modern Marvel or Technological Disaster?

By Tan Teck Boon

Synopsis

Telemedicine is transforming the healthcare landscape. It holds enormous promise but at the same time, also raises a host of questions. A robust understanding of its limitations and even potential dangers is necessary as the technology enters the mainstream.

Commentary

ACCORDING TO the Singapore government, nearly a quarter of Singapore's citizen population will be aged 65 and above in 2030. By comparison, the figure stood at just 13.1 percent in June 2015. With an estimated 900,000 senior citizens to care for in less than 15 years' time, the country faces a monumental challenge.

Indeed, Home Affairs and Law Minister K. Shanmugam had listed an ageing population as one of the four key challenges for Singapore in the coming decades – the other three are terrorism, global competition and a balanced budget. In November 2014, the Singapore government unveiled the Smart Nation initiative and not surprisingly, a major emphasis of this massive undertaking to transform Singapore into a tech-driven nation is telemedicine.

Telemedicine Explained

Telemedicine – defined as medical care delivered remotely – is possible today thanks to the advent of Internet-enabled medical devices, teleconferencing equipment and wearable health trackers. The development of these high-tech gadgets has enabled doctors to communicate, monitor and even treat their patients remotely. With telemedicine, patients no longer have to make non-essential visits to

the hospital and doctors will order them to come in for treatment only when necessary.

For patients needing physiotherapy, telemedicine is a real boon because they can now receive their treatment online. The technology is especially helpful for bed-bound patients since they no longer have to make stressful commutes to the hospital for their appointments.

As far-fetched as telemedicine may sound, it is actually moving into mainstream healthcare. It is not difficult to see that telemedicine can help ease Singapore's ageing pains.

Myriad Benefits Anticipated

Apart from cutting back non-essential hospital visits for senior citizens, the technology will also let them "age in place"; in other words, to grow old in their own homes while drawing on the support and care provided by their communities and loved ones. Fewer hospital visits and stays will also reduce the incidence of hospital-acquired infections.

Another significant advantage of telemedicine is that it tends to cost less than traditional face-to-face medical consultation. A study by the Geisinger Health Plan in the United States has found that telemedicine resulted in cost savings of up to 11 percent every month for patients suffering from heart failure. As healthcare spending continues to rise in Singapore – due in part to a rapidly ageing population – telemedicine will help keep healthcare affordable for senior citizens.

Even though telemedicine holds major benefits for Singapore as the population ages, one should not lose sight of some of its inherent limitations and potential drawbacks.

A Cautionary Note

An obvious limitation is the lack of physical contact between patients and doctors. Telemedicine is certainly convenient for patients since medical care is delivered to wherever they might be. The downside is that doctors cannot perform chest compression when their patients go into cardiac arrest. Neither can doctors touch their patients or listen to their breathing when needed. From a medical standpoint, if doctors cannot properly evaluate their patients, then the risk of misdiagnosis invariably increases. The prime question to ask with telemedicine is: are we sacrificing quality medical care for convenience and affordability?

Potentially, the biggest danger with telemedicine is cyber-sabotage. To be precise, because many of the therapeutic apparatus used in telemedicine are manufactured without digital security in mind, they are actually vulnerable to hacking and manipulation by cybercriminals. In fact, researchers have demonstrated that they can hack an implanted pacemaker and re-programme it to deliver lethal electric shocks to its patient – killing him no doubt.

This problem was evidently serious enough to prompt Dick Cheney's doctors to

disable the wireless function of the pacemaker implanted in the former US Vice President. Because it is not difficult to replicate such a malicious attack, we cannot rule out the possibility that the therapeutic apparatus used in telemedicine could be hacked en masse to kill large numbers of people.

Deadly health consequences aside, telemedicine also heightens the risk of privacy intrusions. Crucially, the data generated by the array of therapeutic apparatus used in telemedicine reveals deeply private personal information. If the data were to fall into the hands of criminals, it can certainly be used to hatch more elaborate scams. Since senior citizens are often the target of scammers, they will be even more vulnerable in this case.

Imagine the kind of humiliation if degrading images of one hooked up to life-sustaining medical equipment were stolen by malicious hackers and posted online for all to see (when the ransom is not paid). The thought of going through such trauma and indignity is probably enough to deter many senior citizens from using telemedicine.

Mitigating Risks

Like almost every major technological development in human history, telemedicine has its downside even as it promises enormous benefits. If our computer is corrupted by a malware, at worst we lose all stored data. However, if medical equipment were hacked by malicious actors, the consequences can well be deadly. So what should Singapore's position be on telemedicine going forward?

Considering the sheer number of senior citizens Singapore has to contend with in less than 15 years' time, the country cannot afford to sit on the sidelines. Telemedicine has risks but failing to take some calculated risks in the face of this 'silver tsunami' will likely see the country in deeper waters. On a more optimistic note, technologies typically mature over time and kinks are resolved in due course.

But for now, one must recognise that telemedicine cannot possibly treat all health problems so even as the technology enters the mainstream, Singapore will need to continue nurturing its healthcare professionals. Building in this redundancy so to speak, will also add resilience to its healthcare system.

On the cybersecurity front, the picture is likely to get worse as cyber-attacks increase in frequency and sophistication. So a comprehensive set of technical, legal and policy measures is needed to strengthen digital defences in the telemedicine sphere. This will ensure that the technology appeals not just to senior citizens but patients of all ages as the country transforms into a Smart Nation.

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