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Appropriating Smartphone Culture into Medicine

Shereen Tang Suet Ping*

Department of Anaesthesiology and Intensive Care, Hospital Canselor Tuanku Muhriz, Universiti Kebangsaan Malaysia Medical Centre, Malaysia

*Corresponding author: Shereen Tang Suet Ping, Department of Anaesthesiology and Intensive Care, Hospital Canselor Tuanku Muhriz, Universiti Kebangsaan Malaysia Medical Centre, Malaysia, Tel: +603-91455788; Fax: +603-91456585; E-mail: shereen_tang@yahoo.com

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Commentary

The invention of smartphone has been described as life changing, revolutionary and cutting edge. Since its introduction back in the early nineties, it had abruptly become an essential component of the present day [1]. Today's alpha generation will embrace smartphone as part of their culture almost immediately following their birth. By the year 2025, members of this group will undoubtedly be technology savvy and liberated. They will view life without a smartphone as an underprivileged one.

Medicine is no exception to the boost in smartphone culture. The increase in smartphone usage by healthcare practitioners has created a large marketing opportunity for development and launches in medical related software applications (apps). One of the top medical related apps includes systematic conservation and retrieval of patients' medical records [2]. Safe and limitless data storage can reduce unsustainable medical costs associated with records keeping. Nowadays, a private and secure virtual hospital network can be established and maintained on smaller budgets. Nonetheless, one of the major pitfalls during initiation of such apps is data security. Data confidentiality can be protected by investing on cyber-security from compromise by potential hackers. As digitized health records are the way forward, both health institutions and its providers play important roles in safeguarding medical data. Healthcare providers have professional obligations to advance themselves using technology. Familiarity with basic software proficiency such as encryptions, passwords protection and systems update is a modern indispensable skill.

The smartphone is being integrated as stand-alone medical equipment. Various patient friendly apps have been created to aid in home-based healthcare [3]. It can be linked physically and electronically to medical hardware accessories allowing monitoring such as blood pressures or glucose control. Uploading medical information onto a secured and dedicated website allows changes in current management prior to doctor's appointment. It promotes patient-centred, home-based and telehealth. These are more cost effective as it reduces in-hospital workloads. The smartphone is also earning a reputation as a healthcare assistant. It is fast replacing cumbersome charts, multiple medication prescription and patients' notes. Its video viewing property allows it to replace that of laryngoscopy, fibre-optic bronchoscopy, ultrasound,

echocardiography and even electrocardiogram screens. There are reminders to assist in regular serological or radiological investigations, assessment and implementation of care bundles which ensures standardized and compliant healthcare deliveries.

The phrase 'information at your fingertips' is more applicable currently following authorization of health-related apps known collectively as mobile health (m-health) [4]. The benefits of searching for free and widely available medical information in a hand held, wireless and light-weight electronic device is undisputable. The pocket size allows easy access and portability for confirming diagnosis, assisting in management, and supporting decisions during clinic sessions, medical rounds, procedures, tutorials and during patient transfers. Such ease of information access can reduce medical errors and mismanagements. However, medical negligence from unreasonable care due to poorly trained or careless healthcare providers is unaffected by smartphone use. The validity of online medical literature and resources remained controversial. Properly conducted medical information seeking via legitimate online search engines is required to maintain appropriate standards of care. Information obtained should be complimentary to recognized international or institutional guidelines and protocols.

Smartphone is the preferred choice by photography enthusiasts [5]. It can capture pictures at high resolutions, various magnifications and in continuous modes. Recording pre-approved live videos of medical procedures, radiological images and patient-doctor discussions have become commonplace. Its silent, small, and compact sized camera makes it low profile without being distracting. Medical films and images are useful for facilitating communication between medical staffs. Those working as first medical responders in an out-of-hospital setting and in rural areas find it particularly informative for their management. Traditional hands-on clinical teaching sessions benefit a few groups of medical, nursing or health allied students at a time. Smartphone photography has upgraded the approach towards medical education by allowing repetitive or simultaneous teaching of larger group of students [6]. However, its subtleness may lead to unintended photos or videos appearing on social media or news. Anyone with smartphones can snap photos or record videos without being noticed. Uploaded images may be subjected to breach of confidentiality, infringement of

copyright laws, state licensing codes and health insurance portability and accountability act (HIPAA) [4].

Connectivity through multimedia messaging services is a cheaper, easier, and faster mass communication alternative than conventional telephone calls or paging systems [4]. Sharing clinical information in this manner improves consultations, referrals, teachings, hospital announcements and patient medical related communication. It is found to be superior when delivering and receiving information in a chaotic, noisy, and busy environment [4]. Although the quality of the transmitted messages does not depend on a third party, it is affected by chat abbreviations which may be informal and unprofessional. The new chat language could be associated with incorrect interpretation of the intended message content. Texting to the wrong person or groups of people is an unavoidable human error. [7] Keeping patients' personal medical information unprotected, unencrypted and longer than required in private smartphones only serves to aggravate the problem. On the other hand, auditing information relating to adverse medical events via texting is difficult. Information conveyed through texting may not be easily saved, retrievable or prioritized. The urgency of the relayed information can be lost during messaging. Incoming messages may not be read immediately by the recipient [3]. There is no differentiation or prompting within the inbox to alert the importance of the message content. On the contrary, those who frequently responds to texting while working is a major global workforce concern. High texting load leads to distraction, reduces productivity and output. Hospitals can develop policies on smartphone use during work with clear instructions on indications and exceptions to avoid abusing the privilege.

There are new and emerging health risks related to excessive smartphones use. Subconsciously, a person's neck flexes when focusing on a smartphone. Prolonged and excessive flexion on the lower cervical and lumbar spine predisposes towards alteration in spine ergonomics [8]. This may lead to degenerative changes in the spine with resultant back pain syndromes and neurological involvement. Adopting good posture habits such as aligning smartphone at eye level and promoting hands free in favour of hand held devices are recommended. The fonts on small screen smartphones are typically small. This places stress on the eyesight. The mean working distance when reading from smartphone was significantly shorter when compared to reading hardcopy texts and leads to increased demands on both eye accommodation and vergence [9]. The effect is worsened when reading in darkly lit areas. Staring far off at intervals and taking prolonged pauses from smartphones are important for adequate vision rest.

Like any other gadgets, smartphone display screen was found to be commonly inhabited by normal human flora. Additionally, smartphones belonging to healthcare workers were associated with higher pathogenic bacteria load [10]. This poses significant transmission of nosocomial infections amongst those critically ill and immune suppressed patients. Hospital owned medical equipment is under strict sanitary regulations. Personal item including smartphone is exempted

from stringent cleaning. Instead, cleaning responsibility falls upon smartphone owners. Routine hand hygiene and smartphone cleansing according to manufacturer's recommendations are advocated.

A technological adept individual is a pre-requisite when optimizing advantages of smartphone utilization in medicine. However, technology commonly forgets the older generation. Healthcare providers and patients alike from the aging population struggle to learn and improve what the younger generation takes for granted. They have difficulty with touch screens sensitivity, have a slower response time, vision issues with smaller screens and navigational difficulty through numerous and unfamiliar apps. They are medically disadvantaged when lacking behind non-accommodating technology. Nowadays, giant smartphone manufacturers are gearing towards advanced age requirements in mind. Larger display screens, alternate choice of pressed buttons versus touchscreens, louder audible volume ranges, customized apps and touch sensitivity for tremors are some less intimidating features favoring the elderly.

Conversely, technology is an international youth obsession which can lead to unhealthy addiction. Smartphones are used by university students beyond 5 hours per day for corresponding, checking messages or emails, updating with latest news, playing games, performing academic related tasks and social networking [11]. These smartphone related activities are performed everywhere from driving, walking, having a meal, taking toilet breaks and even to bed. When technology fails, a condition akin to mental breakdown, panic and withdrawal are seen [12]. In medicine, dependency on technology could mean disruption in a smooth workflow [3]. Management is halted until resumption of power supply or internet connectivity. Regular backup with electrical power batteries and generators with extended lifespan are essential to avoid devastating healthcare disruptions. Alternatively, work can be resumed by maintaining hardcopies for important and urgent tasks.

Smartphone culture is certainly part of modern living. Early 21st century is the landmark moment when smartphone changed our lives. Whenever there is wireless network, there will be undeniably smartphone driven medical practice. From here onwards, there can only be expansion of medicine and smartphone technology. Are we ready for more?

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