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Ling, Rich; Poorisat, Thanomwong; Chib, Arul

2018

Ling, R., Poorisat, T., & Chib, A. (2018). Mobile phones and patient referral in Thai rural
healthcare : a structuration view. *Information, Communication & Society*, 23(3), 358-373.
doi:10.1080/1369118X.2018.1503698

<https://hdl.handle.net/10356/137175>

<https://doi.org/10.1080/1369118X.2018.1503698>

This is an Accepted Manuscript of an article published by Taylor & Francis in *Information, Communication & Society* on 02 Aug 2018, available online:
<http://www.tandfonline.com/10.1080/1369118X.2018.1503698>

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**Mobile Phones and Patient Referral in Thai Rural Healthcare:
A Structuration View**

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Mobile phones and patient referral in Thai rural healthcare:

A structuration view

This paper examines the meeting between the paper-based patient referral system and the use of mobile communication by community healthcare workers in rural Thailand. It focuses on the agency of these workers as their referral practices affect the facticity of the formal healthcare system. The data capture a moment when the practice of informal mobile communication has gained a quasi-institutional, albeit informal, position in the patient referral system. The material suggests a type of symbiotic relationship between the mobile phone and the paper-based system.

This analysis draws on Giddens' notion of structuration to examine how community healthcare workers used their personal mobile phones to deal with various issues before, during, and after referrals. While their mobile-based practices were outside the formal paper-based referral system, that enjoyed the imprimatur of the higher rank health authorities, the use of mobile phones made the referral system more robust and flexible. This paper illuminates how the use of mobile phones by community healthcare workers challenged and in some ways adjusted established practices within the healthcare system. This echoes Giddens' (1984) notion of the tension between stasis and change as developed in the theory of structuration.

Giddens examines how institutions and structures have a stability, but simultaneously a plasticity when actors introduce various types of innovations. The actors in this study are the community healthcare workers. With time, their innovative use of the mobile phone has the potential to expose the malleability of the well-entrenched routines, regulations, traditions, and status hierarchies in the Thai healthcare system. This paper examines an increasingly interdependent interaction between the

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traditional paper-based referral system and the modifications introduced by mobile communication.

Theoretical Framework

Giddens' on Structure, Agency, and Mediated Communication

Giddens' (1984) notion of structuration, at a broad level, frames social activity as an interaction between individual actions in the context of socio-institutional structures. In daily activities, we use our agency within the context of rules, routines, power, and tradition, which in effect reproduce the facticity of broader social structures. Applying this to the empirical material here, the filing of a standard patient referral card is not only an action with reference to a particular case, but also tacitly supports the machinery of the broader healthcare system by providing information for tracing the patients and the service that the staff has provided. While the paper-based referral cards could facilitate interaction by prefiguring mutual expectations, they can also further entrench inefficient bureaucratic processes.

For Giddens, social forms solidify as the sediment of many actors' behavior becomes routinized. Indeed, the institutionalization of routine is one of the most profound characteristics of many social structures. Giddens, echoing notion of frames (Goffman, 1974), notes that interactions become institutionalized through mechanisms such as tradition, routine, custom, and habit. Routine is reciprocally maintained through the weight of its continual re-enactment where all who are involved in a situation are prompted to play a particular role. Should one of us stray too far from the script, we open ourselves to being sanctioned by others who are perhaps more powerful and/or more committed to the successful "institutionalized" completion of the situation. Because of this, all actors are, in some way, vulnerable to one another.

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According to Giddens (1984), our actions are oriented by "clusters of rules which help to constitute and regulate activities" (p. 87). These structures provide us with "ontological security" (p. 50), namely that the system will continue to function in a particular way such that we can answer the question "what is going on here?" (p. 87). As we act within the context of structures, we reflexively monitor our own behavior and the reaction of the system (i.e., an implicit need for accountability in our actions; pp. 539–540). The sum of our and other actors' actions becomes the institutionalization of the structure.

According to Giddens, there is a fundamental duality to structure. In this case, the healthcare system is simultaneously a medium for action (healing people) and an outcome (regeneration of the structure itself). The structure of institutions such as the healthcare system is largely—indeed often vastly—stable. It is not, however, immutable. We, as actors, can also introduce some modifications to the structure through new innovations. Indeed, while some actors will have interest in changing the structure, others will want to hew close to it. Change can be difficult, especially in healthcare systems where issues of life and health are at play. (Shore & Kupferberg, 2014).

In some cases, the alterations might raise eyebrows and be quickly abandoned. In other cases, they can refine or streamline existing processes. In order to become a part of the structure, the alteration needs to be institutionalized. For example, these actions might first gain a foothold as a type of non-institutionalized informal '*fix*' that simplifies the ongoing mission of the institution. Then, with time and repetition, these *fixes* may eventually be adopted into the system itself. Thus, as noted by Giddens (1993), both the stability and the change of social structures is not "a mechanical

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outcome, [but] rather [...] an active constituting process, accomplished by, and consisting in, the doings of active subjects" (p. 121).

This study focuses on the recursive nature of the interaction between the healthcare system and the actions of healthcare staff. Drawing on multiple frameworks, we examine the roles of three elements: human agency, institutional and social structure, and time-space condition. Traditionally, remote locations, distant from the urban hospitals, have constrained the agency of community healthcare workers (Author 07). However, enhanced communication technologies shift the ability to initiate actions; thereby, the assumed massive stability of institutions is in flux (Giddens, 1990, pp. 38-40). Thus, following Jensen (2013), we examine how mobile communicative practices condition human agency and that of social structures in the ongoing processes of structuration (p. 27). Guided by Wanda Orlikowski's structurational model of technology (1992), we also examine ways in which mobile phones may constrain as well as facilitate actions, and how mobile phones can influence, as well as be influenced by, institutional properties.

To better understand the influence of mobile phones, we adopted Giddens' analysis of space and regionalization. According to Giddens (2002), electronic communication has greatly shrunk time and space, resulting in an intensity of social interactions across greater distances (pp. 10-12). This means that "local happenings are shaped by events occurring many miles away and vice versa" (Giddens, 1990, p. 64). We expect the context of patient referral-related tasks to expand with the use of mobile phones compared with the previous system that consists mostly of the paper-based referral cards. Guided by the adaptive structuration theory (DeSanctis & Poole, 1994), we focus on the interaction between the actors and mobile communication to identify the changing structure that follows the expanded context.

Structuration and Community Health Provision

A review of mHealth conducted in developing countries indicated a lack of evidence on how the use of mobile communication among frontline healthcare workers can improve health system efficiencies (Agarwal, Perry, Long, & Labrique, 2015, p. 1012). Hence, there is a need to address the relationship between community healthcare workers and the broader organizational system (Author 01, Author 05, Author 06) (Lehoux, Sicotte, Denis, Berg, & Lacroix, 2002; Wolff-Piggott, Coleman, & Rivett, 2017). Findings from a recent study showed that confusing health system policies with regards the use of mobile phones could lead to a welter of formal and ad hoc practices as employees try to balance job performance with various structural exigencies (Stephens et al., 2017). Hence, “Greater than the challenges related to the technology design and computer engineering are the policy barriers to institutionalizing [community health workers] as an accepted part of the health system” (Braun, Catalani, Wimbush, & Israelski, 2013, p. e65772).

A second concern within the mHealth literature relates to the tensions that arise due to structural differences between rural healthcare workers and the urban hospital-based healthcare system due to varying professional skills (Author 02), and prevailing cultural norms (Agarwal et al., 2015), including gender differences (Author 3) (Jennings & Gagliardi, 2013). This view is supported in the 63 mHealth studies reviewed by Author (04) as well as the analysis of 25 studies by Braun, et al. (2013), which revealed that the preponderance of studies described small pilot projects without addressing the broader socio-structural dimensions of healthcare administration and prevailing cultural practices.

We assert that the structuration approach outlined provides insight into this gap. We address how the use of mobile phones creates tension between the stasis of the

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system and the agency of the individual, and how the existing formal system is progressively being re-adjusted through the repeated exertion of individual agency.

Study Context

Uttaradit, the study site, has one provincial hospital (with more than 150 doctors), eight district hospitals (one in each district; each with 2 to 6 doctors), and more than 60 community health centers (with no doctors). The Ministry of Health encourages community health centers to provide primary care to the people in the community and take of patients with chronic illnesses. In the 22 community health centers examined in this study, some had a nurse, while others had a person with a degree in public health, but no nurse. We refer to the staff at community health centers as community healthcare workers. Most were not trained to diagnose illnesses, nor did they have the authority to prescribe prescription drugs. They could distribute prescriptive drugs for patients with chronic illnesses (e.g., diabetes, tuberculosis, HIV, and mental illnesses), but only after patients had seen a doctor at a hospital who prescribed the medication.

In cases that were beyond their capabilities, community healthcare workers acted as gatekeepers for the healthcare system. They decided on a treatment, and in some cases, whether they should refer the patients to a hospital to see a doctor. These decisions depended on the gravity of each case, in some cases the distance to the nearest hospital, and the patients' willingness to be referred. The community healthcare workers were also in charge of patient follow-ups after patients had been discharged from a hospital.

Patient Referral

To refer a patient, community healthcare workers were required to fill out a referral card, containing information about the patient's condition as well as the

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treatment that had already been provided at the community health center. The patient would take the card to a hospital where, based on the information, an admitting nurse would re-evaluate the patient before providing the necessary treatment or routing him or her to a doctor. A doctor or a nurse might then note down further instructions on the referral card that would be followed up by community healthcare workers when the patient returned home. Thus, in the formal system, the referral card facilitated access to healthcare as it contained the history of that particular medical episode.

Research Question

Our research question seeks to understand how existing institutional properties, such as the paper-based referral system practiced in Uttaradit, Thailand, interacts with the informal use of mobile phones by community healthcare workers and hospital staff as they go through the process of patient referral. Further, we examine how the actors' responses to these opportunities and constraints have shaped, or have the potential to shape, the existing routines and eventually form part of future institutional practices.

Method

Data were collected through face-to-face interviews ($n = 31$) at 9 district hospitals and 22 community healthcare centers in Uttaradit, a province in Thailand. The location of all 89 community healthcare centers in Uttaradit were mapped to allow purposive sampling and thus proportional geographical representation. Eight respondents were nurses from each of the eight district hospitals, one respondent was a nurse from the provincial hospital, and 22 respondents were healthcare workers from community healthcare centers. All interviewees who were contacted completed the interview. Half of the community healthcare workers were from community health centers nearer to the main provincial hospital and the other half were from more remote places. The distance from a community health center to the main provincial hospital

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(the biggest hospital in the province) ranged from 10 to 148 kilometers and the traveling time ranged from about 20 minutes to approximately 3 hours. A letter, stating the study purpose and the procedure, was sent to the director of each hospital and community health center to seek approval. The interviewees were either self-selected or selected by their superior, and all completed a consent form. The interviews, which were conducted in Thai by the Thai author, lasted about an hour and a half. All interviewees received 150 Thai baht (~USD 4.35) in cash as research participation incentive. They were transcribed verbatim and coded by the Thai author.

An open inductive coding method (Glaser & Strauss, 1967) was adopted to create a list of tasks for which the mobile phone was used (i.e., referral, vaccination, disease outbreak control, patient home visits, teleconsultation, volunteer coordination, ambulance services, report submission, etc.). If the call was related to more than one task (e.g., to consult a doctor and then refer a patient), the material would be categorized under all the tasks to which it was related. We focused specifically on coding associated with the task of patient referral, a frequently mentioned task, which became the focus of this study. The richness of the interview material exceeded the scope of this paper.

To identify the themes discussed, the Thai author coded a large selection of utterances that fell into the themes and translated them into English. Using an inductive approach, the authors then collectively refined the themes to develop meaningful connections and implications. This coding strategy was repeated until the themes that emerged clearly reflected the overarching relationships and roles of mobile phones in the existing referral system.

Findings

The material examines the tension between the formal and somewhat rigid, organization of the paper-based referral system in contrast to the more fluid and

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interactive mobile-assisted system for coordinating referrals and handling unexpected events.

Communication Referral Practices

The interviews show that it was common for community healthcare workers to use their own mobile phones when making referrals. They reported calling to notify the hospital of referrals, even though this type of communication was technically outside the formal, paper-based referral system. The interviewees used mobile phones when making referrals to a specific personal contact at a hospital because this allowed them to contextualize the referrals, to clarify borderline cases, to justify their actions, to indicate emergencies, and to provide supplemental confidential information. Referrals were made both with and without the use of the referral cards.

Community healthcare workers usually preferred using personal mobile phones even though there were office landline phones available. The interviewees noted that they preferred to use their own mobile phones when they wanted to contact a specific nurse at a hospital and when they needed to call in an emergency. The individual addressability of the mobile phone (Author 03) allowed them to call directly to specific people in the hospitals who had domain knowledge and were better able to help them with a referral. If the community healthcare workers were to, for example, call the hospital's landline phone, the person taking the call might not have the specific domain knowledge sought, except in cases where hospital-based landline phones were assigned to serve a very specific logistical function, e.g. the general phone in the ER. Another factor pushing the local healthcare workers toward using their own mobile phones was, because of the organization's cost-saving measures. The organization's landline phones were *locked* so as to disallow outgoing calls to mobile phones. Thus, they could not use the local clinic's landline phone to call the mobiles of their contacts in the hospital.

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In sum, the landline system frustrated the community healthcare workers' ability to interact with specific individuals when dealing with referrals, while the mobile phones facilitated their needed interactions to better do their job.

While there were advantages to the community healthcare workers use of mobile phones, this communication channel had only marginal recognition in the formal healthcare infrastructure. When seen through the lens of Giddens and structuration, the community healthcare workers needed to heed the formal routines of the institution, such as using the paper-based referral cards. That said, as we will see, the community healthcare workers use of the mobile phone provided a useful communication channel that existed in parallel with, but somewhat outside, of the formal health provision system. To examine this we will discuss first 'call only' referrals and 'call supplemented' referrals described by the interviewees.

Call Only Referrals

Non-emergency referrals. As what can perhaps be seen as Giddensonian agency, some community healthcare workers did not follow the guidelines requiring them to complete a referral card when sending a patient to a hospital. Instead, for the sake of expediency, they used their mobile phone to call hospital staff before referring the patient, thus avoiding the need to write a referral card. One community healthcare worker, Beam¹ said, "Sometimes there are patients waiting, there is no time to write a referral card. Sometimes [I will] just send the patient and call [the hospital to inform them] later." In these cases, telephonic communication was used in lieu of a referral card for the convenience of the community healthcare worker, albeit in contradiction with the established formal structure.

1. The names of the informants have been changed to anonymize the material

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In other cases, the call was used not only to substitute for a referral card but also to ask hospital staff whether they should refer certain cases. The call served at least two functions. The first function was to help hospital personnel manage the flow of patients, as seen in the comments of Song, a hospital nurse, who said, “If there was no mobile communication, they [community healthcare workers] would go ahead and refer the patients. There would be many [patients]. Workload here [at the hospital] would increase.” We see in Song’s comments the interaction between the structure of the referral system and its modification through the mobile-based communicative practices. The other function the call served was as an expression of *kreng jai* (i.e., to avoid troubling others) for the hospital staff. By asking whether it was okay to refer a patient even though an approval from a hospital nurse was not required, a community healthcare worker was being considerate.

Emergency referrals. In severe emergency cases where the patient clearly needed to be referred (e.g., head injury, heart failures), the community healthcare workers would not seek the hospital’s approval before referring a patient. Noi, an experienced nurse who worked at a community health center, might call to inform the hospital to save time and facilitate referral of emergency cases. She recalled referring a heart patient, “I listened to his heartbeat. It was faster than a horse race [...] I am not going to wait for a doctor [to confirm that I can refer the patient]. I am sending the patient over. Sometimes you do not know where the doctor is.”

These paperless, phone-based referrals facilitated the admission process for emergency cases. According to Muay, “If a patient being referred is an urgent case, [I] would refer that patient and call [the hospital]. The patient can go to a special channel [...] That patient would get to see the doctor before other patients.” In these cases, if there had not been a call, the patient would be subjected to another screening at the

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hospital, thus delaying treatment. The call increased the responsiveness of the system since it effectively allowed the patient to jump the queue of less critical patients.

Referring to acute cases, Kob would call ahead to the hospital staff, stating that, “there would be this case [coming in]. I would like this patient to skip [the registration system]. No need to get a referral card [...] His condition might get worse. Here are the symptoms. This is his name. He is coming.”

The acute cases described here point to the tension between the formal structure and the agency afforded by mobile communication. These referrals did not follow the formal routine of the paper-based referral system, but indeed the mobile phone facilitated referral coordination. Mobile-based calls alerted hospital personnel to the incoming referral, short-circuited the need for a re-evaluation of the case, provided relevant information, and gave the hospital personnel additional time to prepare. As such this illuminates the technically facilitated agency as it moils against the structure of the system.

Call Supplemented Referrals

The most common form of referral was the paper-based referral system supplemented by a call. Indeed, such calls had become a type of quasi-standard practice in spite of their informal status. These informal agreements between the community healthcare workers and the district hospital, intended to facilitate the logistics of the referral process, reflect the interaction between structure and agency. While the paper-based referral system of referral was still the formal routine, the findings suggest that the supplement of telephonic interaction was gaining purchase in the system. This practice was re-adjusting the institutional structure in spite of not having achieved official status. This illuminates how the paper-based referral system was being modified by the informal adoption of mobile-mediated communication.

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Facilitate system navigation. The community healthcare workers called when referring non-emergency patients to facilitate the process and to eventually shorten the waiting time. This was seen as providing local patients a service since the hospitals could be confusing. These calls allowed the patients to bypass portions of the hospital system (i.e., registration counter) by direct referral to someone the community healthcare worker knew or thought the patient should see. Yai, a community healthcare worker, explained that the calls were “for the convenience of our patients [...] it may help our patients go to an express channel instead of having to wait for 2 to 3 hours.” The use of the personal mobile phone in the presence of the patient to make the call made patients feel they were given special care. Such practice which involves deviating from the usual guidelines to please customers was common and sometimes expected in local communities.

Community health workers preferred to consult those with whom they felt comfortable. The person-to-person contact afforded by the mobile phone helped to fulfil this need. Here we see Giddensian agency, played out through Thai culture, in interaction with the institutional structure. On the one hand, there are prescribed formal routines of the institution. On the other hand, there are also the broader cultural norms of society that emphasize relationships. We see the actions of the individuals using their mobile devices to navigate within the institutional structure while upholding cultural norms.

Provide context. Mobile-based referrals added flexibility and responsiveness across a variety of actors in the healthcare system compared to the paper-based referral system. Since the referral cards had limited space, the informants noted that supplementing the paper-based referral system with a call provided context to the

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hospitals. This would not have been possible if a patient was to simply unexpectedly arrive at the hospital holding a referral card, containing inadequate information.

Some referrals required more extensive preparation on the part of a hospital. For example, Tip, a community healthcare worker, phoned to alert hospital staff about a child who needed an endotracheal tube, stating that she “needed to inform them [of] the child’s age so [the hospital staff] could find the right needle size.” If the hospital staff could not secure the correct equipment, the child would have had to be re-routed to another hospital. The call supported system responsiveness since the community healthcare worker was able to call the hospital staff beforehand. This gave personnel the chance to collect the necessary resources and find a doctor who could take the case. If there was no doctor on standby (e.g., in the middle of the night or during lunchtime), the ER nurses noted that they would call a doctor’s mobile phone to seek their assistance. These examples highlight the potential of mobile phones to shape emergency responses when human resources are limited.

Mobile communication has also allowed the community healthcare workers to provide more information to hospital personnel about their referrals. For Beam, verbal communication was superior to text in the referral cards. She explained that “It is like telling a story [...] Telling is better than writing a referral card [...] Sometimes they [hospital staff] want to hear it from you.” Similarly, Nok believed a referral card could not accommodate all the necessary information, elaborating that,

It is not like Miss A is here. [She] had an accident and got a wound here.

I am sending her over. Not like that [...] we had to tell [the hospital staff] the patient’s medical history, which is going to be more detailed than a referral card. Because when writing a referral card, one has to be succinct.

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In some cases, the call allowed hospital personnel to better determine the ability of the community healthcare worker to handle a particular situation. If a hospital nurse felt that a community healthcare worker was not up to a task, she could suggest the patient be referred to the hospital. According to the informants, if the patient received improper care at the community health center, it could compound the problem. The hospital staff would have to deal with the patient's worsened condition and be criticized for not taking in the patient earlier. Thus, the enhanced and speedy information flow afforded by the mobile phones added resilience to the system that was not possible using the slower paper-based offline communication.

Communicate sensitive information. With the paper-based referral system, the diagnosis and case information could be read by the patient. In general, this transparency was not problematic since it helped to inform the patient about his/her medical situation. But sometimes there was a need to communicate culturally-sensitive information about the patient to the hospital. Nit, a community healthcare worker, reported using her mobile phone to communicate about an outcast patient, telling a hospital nurse that, "this patient had been rejected by his family [...] [the patient had] no relatives to go take care of him [at the hospital]." In practice, this meant if the patient was to be admitted to a hospital, no relatives would attend to him. Hence, the hospital nurse would have to make special arrangement in the care of this patient. This type of secondary but highly relevant information was not culturally appropriate to enter onto the referral card. The use of such extra-systemic and a culturally sensitive back channel provided by mobile phones was found to be particularly useful when there was concern that the patients would be negatively affected by the content written in the referral card (e.g., mental illness, a risk of attempting suicide, etc.).

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Justifying referrals to hospital personnel. Mobile phone based referrals often allowed community healthcare workers to save face, or avoid situations that could eventually ruin their reputations. They sometimes felt the need to justify their referrals to the hospital, even though this was not required. Nok, for example, called to let a hospital nurse know that her community health center did not have the drugs with which to treat the patient. Mobile phones provided community healthcare workers an informal extra-systemic channel through which to explain why they had to deviate from formal guidelines, thus protecting them from potential negative feedback by hospital staff.

According to Yai, a community healthcare worker, taking the initiative to call helped to prevent misinterpretation of the referral card's text. Dang, a community healthcare worker, said, "some doctors might not understand us, so they would wonder why [we] referred such a minor case." This was likely to happen with new doctors who were unfamiliar with under-resourced community health centers. In another example, Beam, referred a patient who had prematurely taken off his splint because of discomfort. She was afraid that, at the hospital, the patient might blame her for the splint removal, prompting the doctor to question her competence. Beam said, "I had to tell the doctor what really happened. Sometimes the patient cannot be trusted."

Clarification of treatment. The practice of providing context was also conducted after the patient had visited the hospital and was returning to the care of the community health center. At this point, the community healthcare workers could be made responsible for a follow-up, using the instructions on the referral card passed back to them by the patient. However, unclear instructions could cause confusion. Tee, a community healthcare worker, said, "Some doctors do not write a referral card the way others do. That is, some are very detailed, which is good for us [...] some write just a little." When there was inadequate information, Tee called back for clarification. Again,

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while the formal system of referral cards was structured to distribute needed information, various issues associated with this mode of communication reduced its usefulness. Given these constraints, the ubiquity of the mobile phone system provided an extra-systemic non-formalized channel through which to gather missing information.

Extra-systemic patient update calls. Checking the status of particular referrals is another instance of mobile phone usage outside the formal system. In these cases, community healthcare workers requested known and familiar hospital staff for real-time updates. Prior to the adoption of mobile communication, this type of interaction was difficult. In some cases, community healthcare workers such as Top simply wanted to ensure that the patient had indeed arrived at the hospital. “I was not sure whether the patient that I treated did go [to the hospital] [...] I would call to check whether his condition has improved,” said Top.

Calls were made to follow up with patients in time-critical cases, in addition to the referral cards. A provincial hospital nurse informed Ming, who worked at a district hospital, that the provincial hospital had sent a patient back to her for a follow-up. It was crucial that the patient, who suffered from tuberculosis, started the medication at a particular time. The concern was that the patient could forget to pass the referral card back to the district hospital, thus disrupting the medication schedule, potentially leading to drug resistance. Ming said, “The patient might not manage to give [me the referral card...The hospital staff] called to confirm, so [I] would go to the patient’s house to check to see whether [the patient] was there. It is like double checking.”

In cases such as this, the paper-based referral system was not dynamic enough. By contrast, the real-time flexibility of mobile communication allowed for a more detailed monitoring of the situation.

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Knowledge enhancement calls. The informal interaction between the community healthcare workers and the hospitals had a secondary effect of enhancing professional development in the healthcare system. Noi, a hospital nurse, claimed that less experienced community healthcare workers often called to ask about non-emergency cases (e.g. high blood pressure, asthma or heart problems). She noted that the workers were “hesitant” to refer these cases, but were not completely confident in treating them either. If the nurse and the community healthcare worker have established close a working relationship, the nurse would likely provide guidance via the mobile phone that both enhanced the skills of the community healthcare workers, and simultaneously helped to manage the flow of referrals, which coincided with the broader goals of the health system. This allowed community healthcare workers to address gaps in their knowledge without losing face (i.e., to feel embarrassed). On the other hand, we note the willingness of nurses to undertake extra responsibilities of training outside their core roles to show consideration for others.

In other cases, the community healthcare workers said that they would call the hospital nurse to seek feedback on the diagnoses made. Ton, a community healthcare worker, said, “It is my own system. I follow up [...] so we can improve our quality” noting that without the call, he would have to wait for the referral card to be returned to his community health center, which could take weeks or even months. By then, he might have forgotten about the case. Mobile communication served as a shortcut for community healthcare workers to access information at the hospital that allowed them to reflect upon and improve their skills.

Error management calls. Many informants described how the responsiveness of mobile communication made it a useful tool when dealing with mistakes that threaten the organization’s reputation. As with the referral system, mobile communication added

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flexibility and responsiveness to the structure, albeit via an informal communication channel. Nok, a community healthcare worker, received a call from a hospital informing her that a patient had received the wrong medicine and that the patient should be notified to not to use it. She was, in turn, able to immediately call a community volunteer who could pass the message to the patient. Another time, she used her mobile phone to arrange delivery when staff at the hospital had forgotten to give a prescribed medicine to a patient. These situations underscore how direct, albeit informal, contact afforded by the mobile phone saved both the community health center and the hospital from having to deal with the negative consequences that would have followed if the mistake had not been corrected in time. In terms of structuration, the ongoing functioning of the institutional structure was, in some way, threatened by human errors. The actors then exerted their agency through the mobilization of extra-systemic communication to address the issue in a culturally sensitive manner. We do, however, note that such an informal system, which allows for a non-recorded mistake to be rectified off-record, attends to cultural norms at the expense of institutional rules.

Destabilizing Consequences

The material shows that the flexibility of mobile communication was not always a positive contribution to the established health delivery system. According to informants, using their mobile phones for referrals had unintended, and potentially destabilizing, consequences.

The lack of official records for mobile-only referrals became an issue when trying to manage the flow of patients in the system. Tang, a hospital nurse, explained that if the community healthcare worker only called without sending referral cards, “there will be no record of how many patients have been referred to us. Sometimes we [the hospital staff] did not keep track. [...] It would be good to get both a call and a

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referral card.” She added that she would not request it because asking community healthcare workers not to call or to send a referral card might adversely affect their working relationships. In effect, calling instead of using the paper-based referral system shifted the burden of record-keeping to hospital staff, since the person who took the call would have to remember, then eventually note down, the information until that patient arrived, possibly a few hours or even days after the referral call.

In cases where the hospital staff tending that patient did not take an informal referral call, and where there was no institutional record of the case, the hospital would not have the necessary information about the referral case. Various hospital-based informants recalled having to call a community healthcare worker to ask for the patient’s medical history; whether the patient had any drug allergies; and what medication the patient had received at the community health center.

For the community health centers, lack of a referral card meant there would be no information sent back from the hospital to alert them about the discharge of a patient and the treatment provided, leaving them at a loss for maintenance care, especially for cases that needed a follow-up. Thus, while the informal mobile-based referral system added flexibility and resiliency to the formal system, there were negative ramifications as well.

In short, while mobile communication could accommodate various cultural norms (for example, going to the extra mile to create a shortcut for patients and informally seeking help from familiar colleagues), it also brought with it the other practices that were incompatible with the system requirements.

Discussion

The material from this study shows that compared to the existing paper-based referral system, the use of informal extra-structural mobile communication offers rural

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healthcare workers as well as their colleagues in hospitals more flexibility and resilience in healthcare delivery. Unlike the existing paper-based referral system, mobile communication allows the staff to exchange information that better aligns with their preference as well as cultural norms. Interestingly, this is not the result of a top-down system implementation, but rather emerges from the organic adoption of mobile communication technologies (Author 01). In effect, the material shows the emergence of a symbiotic paper/mobile-based referral system that was used between the community health centers and the hospitals.

The institutionally approved system was based on physical referral cards containing case information. This was an entrenched common-sense solution to ensure appropriate routing of the patient. This assumes that community healthcare workers would *know when to refer*, the patient would *get the card* that contained all the *necessary information* that the hospital staff needed and *go to the hospital as instructed*. The material has shown, however, that the paper-based referral system has awkward and inflexible aspects, especially when situated in the context of human agency, and juxtaposed against cultural norms. While the paper-based referral system is a viable, low-tech solution, it can result in less than optimal planning and limited information sharing. The extra-systemic channel provided by the mobile phone utilizes social connections. It offers flexibility and robustness to the referral system, and more importantly, it accommodates cultural practices.

The paper-based referral system can cause problems for the patients. They can lose the cards, and since the information on the cards is not networked in any way, it becomes difficult to anticipate the needs of the patients at the hospital before they arrive. In addition, the effectiveness of the referral card depends on the patience (and penmanship) of the person entering the information and how long it takes before it

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reaches the receiver. Thus, while the paper-based referral system is a reasonable solution, it can result in less than optimal planning and limited information sharing. However, from the perspective of the formal institutional structure, there is inertia in the paper-based referral system. It has a formal position in the ongoing operations of the broader health system. In most cases, it is the basis of the gatekeeping function of the community health centers, and it is the way for patients and medical personnel to keep track of their progress through the system.

The material here suggests that informal mobile-based communication was being used in parallel with the formalized system. This was seen in the way that the community healthcare workers secured referrals for their patients, how information was distributed and how sensitive information was communicated. It was also seen in the way that tacit agreements between the community health centers and the hospitals had arisen in order to supplement the paper-based referral system. The mobile phone provided a solution that was more flexible and more responsive than the paper-based referral system. That is, the individual healthcare worker, be it one in a community health center or in a hospital, increasingly found that in order to do their job, they needed to have a mobile phone that they themselves paid for.

The material suggests that interactions via mobile phones had begun to be a *de facto* albeit extra-systemic part of the healthcare information ecosystem in rural Thailand. Indeed, the material illuminates how there has developed a type of symbiotic structuring between the paper-based referral system and mobile communication. Both had their role in the provision of healthcare but only one portion of it was a part of the formal healthcare system. If one, however, broadens the notion of the system to include the routinized practices associated with rural healthcare provision, then both referral channels, and their interweaving are becoming a part of *the system*.

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Giddens' structuration theory provides a useful framework for analyzing the interaction between structure and agency. The framework allows us to see how the community healthcare workers and the hospital personnel are in a Giddensonian constituting process (1984). They are working out the process, the rules, the expectations and the ethics of mobile/paper-based referrals. In their quotidian interactions, they are changing the referral system so as to make it more responsive to their various needs in spite of the firmness of the existing structure.

Indeed, the material captures the period during which the actions of the individual practitioners and their use of mobile communication was becoming an ancillary structure in itself. Thus, in Giddens' words (1993), the use of the mobile phone by the community healthcare workers and their counterparts in the hospitals is "the doings of active subjects" (p. 121). It is in their use, and in the nascent routinization of this practice, that we see the tectonic interaction between the routine structure of the healthcare system and the assertion of agency. The shifts in the rigidity of the paper-based referral system in contrast to the functionality of the mobile phones illuminates the stasis of the structure and probes the potential for readjustment of the structure (Giddens, 1990, pp. 38-42).

It is worth noting that Giddens structuration theory did not quite capture the multiple layers of structure that interact with the agency. A closer examination of the material reveals the use of mobile communication was also influenced by the broader Thai local cultural norms. Community healthcare workers used mobile phones not only to achieve efficiency, speed, responsiveness and their personal needs but also to meet social expectations and to align with the Thai cultural norms. This emerged noticeably in the use of mobile communication to seek advice from a familiar colleague, to indirectly obtain an informal approval to refer a patient, to provide special care for their

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patients even if that meant deviating from the normal procedure, and to try to justify referrals even though they were not required to do so. These acts all reflect Thai cultural concepts such as *kreng jai*, which is “to feel reluctant to impose upon another person” (Komin, 1991, p. 164), *save face*, which is to avoid embarrassment (Boyle, 1998), and *nam jai*, which is to care and concern for others (Knutson, Komolsevin, Chatiket, & Smith, 2003). It is perhaps interesting to note that while the mobile communication modified and often changed institutional norms, it is at the same time upholding the broader Thai cultural norms through the informal communication afforded. Taking into consideration the broader cultural norms will allow one to better understand, manage, and plan the adopting of mobile communication in the healthcare system.

As noted above, the organic adoption of the new communication channel of mobile phones by actors in the system has resulted in the need to re-examine the existing institutional structure within the broader culture. This development has shifted the locus of interaction and has opened up to question the structural routines (Giddens, 1990, pp. 38-40). As suggested by Orlikowski (1992), the technology has facilitated various types of interactions (and power structures), just as it carries with it a new set of constraints/influences on the structure. While there is a stability and a facticity in the existing structure, the material here seems to indicate that the adoption of telephonically assisted referrals is illuminating the malleability of the broader healthcare system.

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