BEHAVIOURAL INTENTION TO ADOPT PHARMACOGENOMICS AND ITS PREDICTING FACTORS IN MALAYSIA

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ABSTRACT

Advances in pharmacogenomics technology research have, to a great extent, uncovered the differences in the genetic basis of interindividual responses to medication. Pharmacogenomics (PGx) is an evolving area in precision medicine with the goal of identifying an individual's response to drugs, detecting those at risk of developing adverse events, and guiding healthcare providers in terms of selecting the correct drug dose. This technology is useful with regard to improving both the efficacy and the safety of drug prescribing. The successful development and implementation of this technology is highly dependent on public acceptance, which is reflected in their intention to adopt this technology. Therefore, this paper aims to assess the intention of the Malaysian stakeholders to adopt PGx and its associated predictors. Results of the study showed that the Malaysian stakeholders were moderately engaged with medical genetics, have high trust in the key players and were highly religious. Additionally they perceived PGx as highly beneficial and rated the risks and moral aspects as moderate which translated into high intention to adopt PGx.

Keywords: Pharmacogenomics, Behavioural Intentions, Predictors, Malaysia.

INTRODUCTION

Advances in pharmacogenomics technology research have, to a great extent, uncovered the differences in the genetic basis of interindividual responses to medication (Weng et al., 2013). Pharmacogenomics (PGx) is an evolving area in precision medicine with the goal of identifying an individual's response to drugs, detecting those at risk of developing adverse events, and guiding healthcare providers in terms of selecting the correct drug dose (Ji et al., 2018). Continuous research on PGx is necessary as Adverse Drug Reactions (ADRs) have been identified as a significant problem in the healthcare system (Austin, 2018). Since individuals react differently to certain medications, it is essential to understand individual variability in order to improve both the efficacy and the safety of drug prescribing. Understanding how a drug is metabolized, and which enzymes are involved in the process, is important in order to predict the potential and the extent of drug-drug interactions (Ishikawa & Hayashizaki, 2012).

The successful development and implementation of new technologies is heavily dependent on public support, as reflected in their intention to adopt the technology (Pin, 2009). Intention has been defined as one of the motivational factors that influence a behaviour and to indicate how hard people are willing to try or how much effort they would exert to perform the behaviour (Armitage & Conner, 2001). Many past studies have reported that intentions have

revealed a significant positive relationship between intention and behaviour, and accurately predicted a variety of action tendencies (Salleh et al., 2015).

The conceptual framework used in this paper was developed based on the attitude towards biotechnology applications model proposed by Pardo et al. (2002) and Brehdahl's attitude model towards GM foods (1999). The model in Figure 1 begins with factors that are known to trigger behavioural intention, and the variables are arranged according to their assumed influence upon the subsequent variables. In this study, the overall intention towards adoption of PGx is determined by the specific perceptions with regard to risks and benefits (Amin et al., 2014) and moral concerns (Amin et al., 2011). General attitudinal factors such as engagement, trust in key players, and religiosity, are also included, since past studies have shown that these variables give causal interpretations to risk and benefit perception (Amin et al., 2014). The strategic management of PGx cannot be conducted as a one-way approach. Instead, communities in Malaysia need to participate in giving their views with regard to the successful implementation of the technology. Therefore this paper aims to assess the intention of the Malaysian stakeholders to adopt PGx and its predicting factors.

CONCEPTUAL FRAMEWORK

Figure 1 illustrates the conceptual framework of factors with regard to predicting public-behavioural intentions towards PGx. The first construct is referred to as general factors. It consists of three components (engagement, trust in key players and religiosity). The second construct also consists of three components involving specific factors (perceived benefit, perceived risk and perceived moral concern). The final and main construct of this study refers to the intention to adopt PGx application in Malaysia. The arrow in the model shows the interrelationships between the variables.
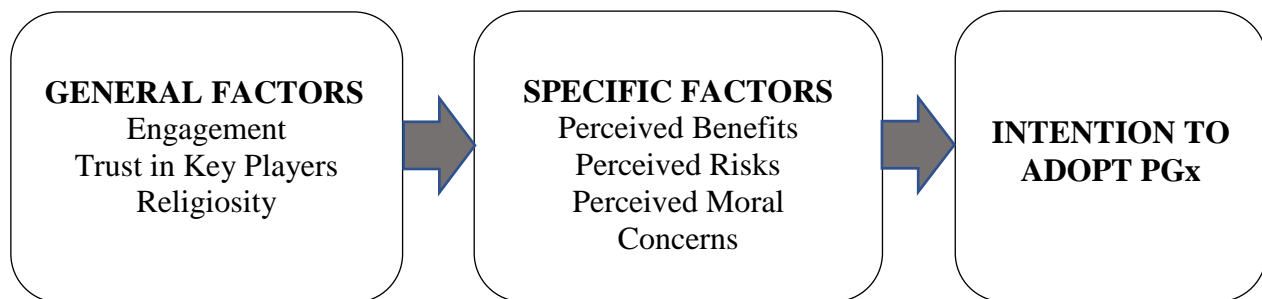
GENERAL FACTORS
Engagement
Trust in Key Players
Religiosity

→

SPECIFIC FACTORS
Perceived Benefits
Perceived Risks
Perceived Moral Concerns

→

INTENTION TO ADOPT PGx

FIGURE 1
CONCEPTUAL FRAMEWORK OF FACTORS INFLUENCING PUBLIC-BEHAVIOURAL INTENTION TOWARDS PHARMACOGENOMICS APPLICATION IN MALAYSIA

Engagement

Ensuring public engagement with science and technology is an important step with regard to achieving their support (Pardo et al., 2002; Ji et al., 2018). The engagement factor used in this study consisted of three sub-factors in the form of past and intended behaviour, awareness and knowledge, and referred to the informed public. The concept was first introduced by Gaskell et

al. (2003) based on a public issue taken from political science. Amin et al. (2017) indicated that engagement was found to have a significant relationship with perceived benefits of biodiesel.

Trust in Key Players

Trust is defined as the belief in the other party involved having ability, integrity and benevolence (Zhou et al., 2018). The term trust here refers to the participants' willingness to rely on the information provided by local healthcare professionals, governments and institutions with regard to delivering medical genetics services. Pin (2009) reported that the trust factor significantly contributed as an indirect predictor for the adoption of nutrigenomics while Amin et al. (2011) showed that trust as an important factor influencing positive attitudes towards GM technology (Amin et al., 2011).

Religiosity

Religiosity refers to religious orientation and involvement, including ritualistic practices (Amin et al., 2014). Malaysian stakeholders have claimed to have a high level of attachment to their religion (Amin et al., 2011). Previous studies have reported that religion and religiosity will affect the public's view and their perception of new technologies (Amin et al., 2011:2017).

Perceived Benefits and Risks

Public perception of the benefits and risks of new technologies is an important element in determining their successful acceptance and implementation (Frewer, 2017). When individuals perceive a benefit resulting from their behaviour or choice, the perception of risk associated with it will be lower (Frewer, 2017). Previous studies have indicated that perceived benefits and risks are not independent, but are complex and difficult to conceptualise separately. The perception of the benefits associated with technology covers producers and consumers, and relate to health and societal issues, while the perception of risks is usually related to long-term effects on human health, the environment, and societal and ethical issues (Rowe, 2004).

Perceived Moral Concerns

In some research, moral norms (personal beliefs about right and wrong) were found to be a significant independent predictor of intentions and behaviours as well as of attitudes (Sparks & Shepherd, 2002). Moreover, Gaskell et al. (2003) has revealed that moral acceptability appears to act as the mandatory determinant for the support of biotechnology applications. Amin et al. (2011:2013) noted that moral concerns appear as a major predictor of risk perception and overall attitude towards GM foods in Malaysia.

METHOD

The study was conducted from June to September 2018 in three established government hospitals which provide medical genetics services to patients in the Klang Valley region. Two groups of stakeholders were selected. Healthcare providers in the form of local health practitioners comprised the first group (n=221), while the second group was comprised of patients with genetic diseases and members of their family (n=200). The multi-dimensional instrument measuring behavioural intentions to adopt pharmacogenomics applications, including

the factors that predict such intentions, was developed based on earlier studies and was validated as part of this study (Gaskell et al., 2003; Amin et al., 2014). The content validity of the instrument was revised by five experts in the areas of consumer behaviour and perception studies, ethical issue in genetics, environmental management and measurement, respectively. A brief introduction regarding PGx and its purpose was issued to the respondents prior to the interview. All items were measured using a 7-point Likert scale. Ethical approval for this study was obtained from Medical Research and Ethics Committee (MREC), Ministry of Health, Malaysia.

RESULTS AND DISCUSSIONS

Overall, the Malaysian public in the Klang Valley region expressed high intention to adopt PGx (mean score of 5.39) (Table 1). Looking at the predicting factors, the Malaysian stakeholders claimed to have moderate level of engagement with medical genetics (mean score of 5.05) (Table 1). On the other hand, they acknowledged high trust in the key players (scientists, governments and industries) and rated themselves as highly religious regardless of their faiths (mean score of 5.31 and 6.31, respectively) (Table 1). With regard to specific predicting factors, the Malaysian public were found to be cautious. The respondents perceived PGx as possessing high benefits (mean score of 5.53) but at the same time, they perceived the application as having moderate risks and moderate moral concerns (mean score of 3.77 and 3.03, respectively) (Table 1). The results of this study are not surprising as several studies worldwide reported that the public are generally supportive towards PGx but they also expressed their concerns on the associated risks such as privacy issues (Haga et al., 2012). Fallaize et al. (2013) also reported that individuals with symptoms of diseases are likely to engage with PGx on condition that it should be delivered in an acceptable manner and the privacy concerns addressed adequately.

Table 1 INTENTIONS TO ADOPT PHARMACOGENOMICS		
Dimension	Mean score ± Standard deviation	Interpretation
Engagement	5.05 ± 1.49	Moderate*
Trust in Key Players	5.31 ± 0.94	High
Religiosity	6.31 ± 0.97	High
Perceived Benefits	5.53 ± 0.98	High
Perceived Risks	3.77 ± 1.19	Moderate
Perceived Moral Concern	3.03 ± 1.39	Moderate
Intention to Adopt PGx	5.39 ± 1.13	High

Note: 1-2.99: Low; 3.00-5.00: Moderate; 5.01-7.00: High.
*: 0-3.33: Low, 3.34-6.66: Moderate, 6.67-10: High.

CONCLUSION

The successful implementation of new technology such as PGx is a complex issue that should be considered seriously by the PGx industries, policy makers and scientists prior to embarking on further research development and possible large scale application. This paper has contributed to the research knowledge in examining the public-behavioural intentions to adopt PGx application and the contributing factors on the part of the Malaysian public. PGx has great potential to be adopted by the Malaysian public but their concerns on the associated risks and moral aspects need to be studied further.

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