

# DEVELOPMENT OF A QUESTIONNAIRE FOR ASSESSING FACTORS PREDICTING BLOOD DONATION AMONG UNIVERSITY STUDENTS: A PILOT STUDY

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**Abstract.** University students are a target group for blood donor programs. To develop a blood donation culture among university students, it is important to identify factors used to predict their intent to donate blood. This study attempted to develop a valid and reliable measurement tool to be employed in assessing variables in a blood donation behavior model based on the Theory of Planned Behavior (TPB), a commonly used theoretical foundation for social psychology studies. We employed an elicitation study, in which we determined the commonly held behavioral and normative beliefs about blood donation. We used the results of the elicitation study and a standard format for creating questionnaire items for all constructs of the TPB model to prepare the first draft of the measurement tool. After piloting the questionnaire, we prepared the final draft of the questionnaire to be used in our main study. Examination of internal consistency using Chronbach's alpha coefficient and item-total statistics indicated the constructs "Intention" and "Self efficacy" had the highest reliability. Removing one item from each of the constructs, "Attitude," "Subjective norm," "Self efficacy," or "Behavioral beliefs", can considerably increase the reliability of the measurement tool, however, such action is controversial, especially for the variables "attitude" and "subjective norm." We consider all the items of our first draft questionnaire in our main study to make it a reliable measurement tool.

**Key words:** blood donation, Theory of Planned Behavior, questionnaires, students, validity and reliability

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## INTRODUCTION

One of the most significant current discussions in transfusion medicine is blood donation and the increasing need for blood and blood components. According to Blood Centers of the Pacific, more than

4.5 million patients, about 14% of all patients admitted to hospitals, require blood transfusions each year in the US and Canada (Blood Centers of the Pacific, 2009). Donated blood is the basic material for production of biological drugs, such as albumin and anti-hemophilic factors. Putting all these together with the failure of technology to produce an artificial substitute for human blood able to be used for transfusions, we are still dependent on voluntary blood donations (Winslow, 2006; American Association of Blood Banks, 2007). Studies from Malaysia, where our study was conducted, indicate, although blood donations increased from 202,241 units in 1992 to 477,365 in 2006, less than 0.12% of Malaysians actually donate blood (Saifuddeen, 2002; Tan, 2009). It has been estimated approximately 600,000 Malaysians suffer from thalassemia, and many of these patients must receive blood regularly (Malaysia Thalassaemia Society, 2009).

In order to overcome the shortage of donations of safe blood in Malaysia and in other countries, the current strategy of blood donor programs in all blood centers is to make a maximum effort to recruit safe blood donors from special, low-risk groups, such as university students (WHO, 2007; Tan, 2009). According to the Malaysian Ministry of Health, university students are a target group of the Malaysian National Blood Center for mobile blood drives (Tan, 2009). Therefore, it is important to determine predictive factors associated with the decision to donate blood among university students. If we know these factors, they can be used by the national blood policy makers to design donor recruitment programs (Ludwig and Rodrigues, 2005; Ferguson *et al*, 2007; Christopher *et al*, 2008).

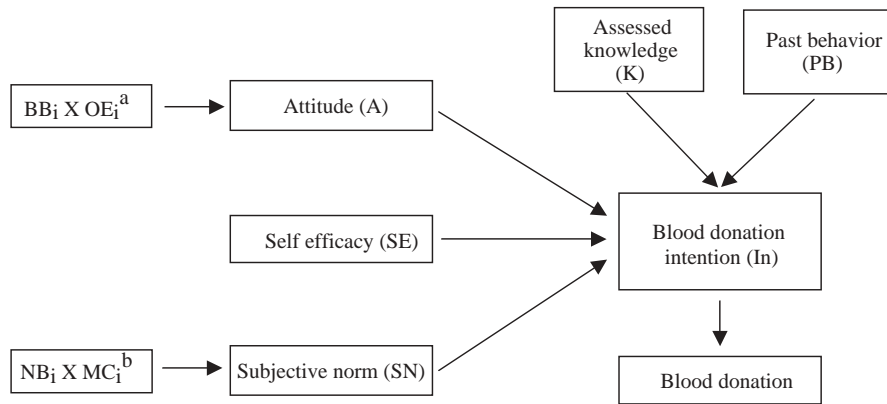
Since no research has been conducted

to define a model for blood donation intention behavior among university students, we decided to assess the intention to donate blood among this population.

One of the theoretical frameworks proven valid for predicting social behavior is the Theory of Planned Behavior (TPB) (Armitage and Conner, 2001a). According to the TPB, actual behavior is determined by the person's behavioral intention, which, in turn, can be predicted by three factors: attitude (A) towards behavior, which is the overall evaluation of the behavior; subjective norm (SN), which refers to the perceived social pressure to perform a behavior; and perceived behavioral control (PBC), which is the person's feeling of having control over their behavior (Ajzen, 1991; Jillian *et al*, 2004). In the context of blood donation, self efficacy (SE), which is the belief that one is capable of successfully performing a particular task, is a stronger predictor of the behavioral intention than PBC (Armitage, 2001b; Giles *et al*, 2004). Attitudes about behavior can be indirectly measured by a combination of commonly held beliefs about behavior and their negative or positive outcomes. Subjective norms can be assessed by normative beliefs that relate the source of social pressure and the motivation to comply. The purpose of this study was to design, validate and examine the reliability of an assessment tool. The framework of our study is illustrated in Fig 1.

## MATERIALS AND METHODS

This was a cross-sectional pilot study conducted at the Universiti Putra Malaysia (UPM). UPM was established in 1971 and is located in Selangor State. The survey questionnaire was prepared and validated based on complete reviews of the literature, of the guidelines from Ajzen, of



<sup>a</sup>BB, Behavioral belief Items; OE, Outcome evaluations, where  $i = 1$  to  $k_1$  and  $k_1 =$  number of questionnaire items for indirect assessment of attitude.

<sup>b</sup>NB, Normative belief items; MC, Motivation to comply, where  $j = 1$  to  $k_2$  and  $k_2 =$  number of questionnaire items for indirect assessment of subjective norm.

Fig 1–The proposed model of intention to donate blood among university students.

a textbook related to constructing valid TPB questionnaires and comments from blood transfusion experts (Ajzen, 1991; Jillian *et al*, 2004). The questionnaire was developed to assess the constructs of attitude, subjective norm, and self efficacy as the predictive factors with intention as outcome variables in the model. We included a second model for assessing the correlation between the indirect measurement of attitude (*ie*, the sum of all of the behavioral belief items multiplied by their related outcome evaluations) and its direct measurement. In the same way, we added variables of normative beliefs and their related motivation to serve as a tool of indirect measurement of subjective norms in the third model. Finally, we decided to extend the TPB model of blood donation by including the knowledge of blood donation among university students as a probable predictor of behavior. We employed a previously validated questionnaire on knowledge of university students for this purpose (Wiwanitkit, 2002).

For measuring the variable “behavioral intention,” we used the method “gen-

eralized intention” to prepare the questionnaire items. This is the most commonly used method for health-related TPB studies. It states three items using the “I expect to...,” “I want to...,” and “I intend to...” can demonstrate adequate internal consistency for the intention section of the questionnaire (Armitage, 2001a; Jillian, 2004). In this method, the mean score of the total intention items is considered as the intention score. For direct assessment of attitude score, we built statements using the term “Overall” at the beginning of each statement. The first attitude item was stated: “Overall, I think that donating my blood is pleasant.” We replaced the word “pleasant” in the first statement with the “wrong thing to do,” “a good idea,” and “unnecessary” to build other attitude items (Table 1). For determining the most commonly held beliefs, we conducted an elicitation study on a sample of 24 students, with eight students each from engineering, social, and medical schools. In this stage, we used three open-ended questions (Table 2) to elicit the behavioral and normative beliefs about blood donation as

Table 1  
Questionnaire developed for assessing the behavior of blood donation among university students.

Constructs of the blood donation behavior study	Questionnaire items
Intention	I expect to donate blood in the coming six months. I want to donate blood in the coming six months. I intend to donate blood in the coming six months.
Attitude (direct measure)	Overall, I think donating blood is pleasant. Overall, I think donating blood is the wrong thing to do. Overall, I think donating blood is a good idea. Overall, I think donating blood is unnecessary.
Attitude (indirect measure)	
a. Behavioral beliefs	If I donate blood, I will feel that I am doing something harmful to me. If I donate blood, I will save patients' lives. If I donate blood, I will become anemic. If I donate blood, I will lose weight.
b. Outcome evaluations	Doing something harmful to me is desirable to me. Doing something that saves patients' lives is desirable to me. Becoming anemic is desirable to me. Loosing weight is desirable to me.
Subjective norm (direct measure)	People who are important to me think that I should NOT donate blood. I feel under social pressure to donate blood. I am expected to donate blood. People who are important to me want me to donate blood.
Subjective norm (indirect measure)	
a. Normative beliefs	My parents think I should donate blood. My closest friend would disapprove of my donating blood. My classmates think I should donate blood.
b. Motivation to comply	Doing what my parents do is important to me. My closest friend's approval of what I do is important to me. Doing what my classmates think I should do is important to me.
Self efficacy	I am confident I could donate blood if I am asked to do so. I think I am too weak to donate blood. For me, it is easy to donate blood. I think do not have enough blood to donate blood.

the basis for questionnaire items for indirect assessment of attitude and subjective norms. In order to guarantee questionnaire items for these constructs reflect the beliefs of our study population, we selected the most frequently stated behavioral and

normative beliefs. Then, we added the most frequent beliefs in standard format to develop the respective questionnaire items. Finally, we conducted a pilot study for assessing the reliability of the questionnaire, and gathered additional comments

Table 2  
Content of open-ended questions to elicit commonly held beliefs regarding blood donation.

Construct	Questionnaire items
Behavioral beliefs	<ol style="list-style-type: none"> <li>1. What do you believe are the advantages of blood donation?</li> <li>2. What do you believe are the disadvantages blood donation?</li> <li>3. Is there anything else you associate with blood donation?</li> </ol>
Normative beliefs	<ol style="list-style-type: none"> <li>1. Are there any individuals or groups who would approve of your donating blood?</li> <li>2. Are there any individuals or groups who would disapprove of your donating blood?</li> <li>3. Is there anything else you associate with donating blood?</li> </ol>

from the population about the questionnaire items in order to prepare the final draft of the questionnaire for the main study. Since the socio-demographic characteristics of subjects can affect correlation among variables in a proposed model, we entered the participants' age, gender, marital status, level of education, field of study and race into the pilot questionnaire.

For the purpose of data collection for the pilot and the main study, we collected the e-mail addresses of more than 10% of the students of the School of Graduate Studies (SGS) using a systematic sampling method. In the pilot study, an e-mail was sent to students to provide a brief introduction to the study and the researcher and to explain the importance of participation in the study. The participants were then asked to follow the hyperlink at the end of the invitation e-mail. In order to enhance data security, which is an important ethical consideration for on-line research, we used a web-based questionnaire rather than an e-mail questionnaire (Madge, 2006). As a second measure for research ethics, the introductory page of the research project consisted of an introduction to the study and its objectives, as well as the required information for participation in the study. The participants

were then asked to submit the consent form and enter the study by pressing the "I accept the invitation to participate in the study" button (Madge, 2006). As another measure for on-line research ethics, the participants were able to withdraw from the research at any time by clicking on an exit button next to the submit button, both on the informed-consent page and the survey page (Madge, 2006).

## RESULTS

Table 3 illustrates the results of the reliability analysis of different constructs of the questionnaire. It is suggested for TPB studies, the internal consistency scale of the items in each of the constructs of the theory should be above 0.60 (Jillian, 2004). According to Chronbach's alpha calculated with SPSS (SPSS, Chicago, Illinois USA), there was adequate internal consistency among items in our questionnaire, especially among knowledge, self efficacy, normative beliefs, behavioral beliefs, and behavioral intention.

## DISCUSSION

Removing item 4 from attitude, item 2 from subjective norm, item 1 from self efficacy, and item 2 from behavioral beliefs

Table 3  
Reliability statistics for the questionnaire items

Constructs	Cronbach's alpha	Item No. considered for removing	Characteristics of the item considered for removing		
			Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
K	0.751	-	-	-	-
A	0.650	4 <sup>a</sup>	0.196	0.351	0.701
SN	0.624	2 <sup>a</sup>	0.068	0.007	0.743
SE	0.873	1 <sup>a</sup>	0.392	0.441	0.941
BB	0.786	2 <sup>a</sup>	0.164	0.213	0.873
NB	0.798	-	-	-	-
In	0.935	-	-	-	-

<sup>a</sup> Removing items No. 4, 2, 1 and 2 from A, SN, SE and BB respectively, can considerably increase the reliability

can considerably enhance the reliability of the measurement tool. Generally, the inclusion of more items in the questionnaire is expected to produce greater reliability, but, after removing the mentioned items, we still have at least three items in the constructs attitude, subjective norm, and self efficacy, which are adequate in assessing the respective variables (Thakral *et al*, 2005). Since the reliability of the measurements before deleting the mentioned items was acceptable, all these items were kept in the main study to determine the effect of their removal from the measurement tool in a larger population. Another noteworthy finding in the pilot study was that exploring the first five submitted questionnaires showed that only one of the participants mentioned her/his race. It seems we do not need to control for the effect of race on the model in a direct way. For the purpose of reliability of results and because variety in nationality and religion of local and international students may affect study variables and the manner of answering questions, we decided to remove the variable "race" from the study. One of the limi-

tations of the study was the impossibility of assessing the effect of factors, such as religion and culture, on the intent to donate blood. We addressed this problem by eliciting the most common beliefs among the study population through the open questions used for elicitation of the study. Thus, while the first five submitted questionnaires had to be omitted from analysis of the pilot study, the effect of culture and nationality, can be controlled for in future studies by comparing the results of the proposed model in different countries.

The main study is still underway. Our findings show the optimum number of items for each of the constructs of the TPB model to produce adequate reliability. We learned from the pilot study and revised the survey tool, this will be administered to a larger population for data analysis. One future direction of this study could be to the administer the same questionnaire to similar populations in different countries in order to indirectly control for the effect of the cultural differences on factors explaining the variation in intent to donate blood.

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