Original Article

My Opinions Matter! How Perspectives, Knowledge and Expectations Matter in Moderating the Success of New Pharmaceutical Services Implementation in Malaysia

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ABSTRACT

The Malaysian Government through the National Health Policy aims to improve health outcomes through public pharmaceutical healthcare services. Pharmacy Value Added Services (PVAS) was introduced as a matter of public pharmaceutical health policy. PVAS is an important service to improve clinical outcomes by improving compliance, monitoring and even information dissemination. However, adoption rates are low and therefore hampering the achievement of national health policy goals. Our objective is to explore the key determinants and moderators of successful implementation of new public pharmaceutical services by investigating the cognitive perspectives of patients' intentions to adopt with the Theory of Planned Behavior as the theoretical framework. A two-phase mixed methodology involving first a qualitative exploration and the second a quantitative phase was conducted in public health facilities in Negeri Sembilan, Malaysia. A cross-sectional survey (N = 410) was conducted using the Pharmacy Value Added Services Questionnaire (PVASQ). Multiple regression and robust moderation analysis were performed. Overall, perspectives were found to be significant predictors of intentions. In greater detail, subjective norms, perceived behavioural control, knowledge, expectations and ethnicity were found to be significant predictors of intentions to adopt PVAS. Perspectives and expectations are found to exert significant partial effects on intentions. We find that a significant self-reinforcing feedback loop exists between Expectations-Perspectives-Intentions. Positive perspectives and meeting the high expectations of the public can greatly improve the uptake of the new service. Ethnicity plays a crucial role in determining uptake of the new service and should be given greater focus. Our results are robust and suggests that a bottom-up approach should be key to successful implementation of health policies and services.

Key words: Pharmacy Value Added Services, Perspectives, Intentions, Theory of Planned Behavior, Moderation

INTRODUCTION

The Ministry of Health Malaysia (MOHM) has a simple but important goal; better health status of its people. To achieve this simple but elusive goal, MOHM strives to create national health systems that is patient centred, fair, affordable, and innovative by emphasizing on community participation to empower individuals to take responsibility and engage in positive actions to attain their full health potential.[1] To achieve these goals, MOHM initiated a large nationwide natural experiment by launching a fully government funded and supported Pharmacy Value Added Services (PVAS) program under

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the authority of the Pharmaceutical Services Division (PSD). PVAS can be defined as any other new innovative service provided by pharmacist other than the traditional over the counter dispensing at the pharmacy. This includes services such as drive-through pharmacies, integrated dispensing services, SMS services, and postal delivery. The purpose of the program is to promote the "Quality Use of Medicines" which is an overarching aim of the PSD.[2] A complete list of PVAS can be found in Manan (2014).[2]

In other countries, these services are called 'extended' services and are usually operated through private community pharmacies.[3,4,5,6,7] In some cases, these services even include alcohol interventions in Scotland.[8] and methadone dispensing in Malaysia.[9] In the developing world, these services are growing in importance and in demand by the public.[10]

Clearly as far as we are aware, PVAS has a great role to play in promoting and achieving clinical outcomes for patients by improving adherence, access to medicines and even drug information through pharmacists' intervention. However, the Malaysian experience is almost exclusively a government initiative to reduce the healthcare burden on public healthcare centres. These heavily burdened public facilities fulfil prescriptions that was increasing steadily from 32 million in 2007 to 43.4 million in 2011 for a nation with a population of approximately 30 million inhabitants.[11] This increasing trend of workload is a tremendous strain on time and resources that is pushing the limits of public pharmaceutical services as well as causing great distress to patients.

In MOHM's effort to mitigate the long waiting time and smoothen the dispensing process, creative innovations such as PVAS were created and put to test in numerous pilot projects in MOHM hospitals. However, despite the tremendous patient load and high investment of infrastructure and manpower, the chief problem is that PVAS adoption remains very low. This outcome is not supportive of the ministry's efforts to promote greater public health status to achieve National Health Policy goals.[12] Interestingly, public uptake of these new public health pharmacy services is also reported to be slow despite many respondents being highly willing to use such new services.[7,13] To understand PVAS more clearly, we must understand the determinants of PVAS adoption intention among patients. This leads us to our objectives.

OBJECTIVES

The first objective of this study is to explore how the public's perspectives, knowledge and expectations act as determinants of intention to adopt PVAS using the Theory of Planned Behaviour (TPB) as our theoretical model. We extend the TPB to include knowledge and expectations as possible predictors and moderators. There a rich literature that describes the role of knowledge and expectations as behavioural moderators.[14,15,17,17] The second objective is to study the role of knowledge and expectations in moderating perspectives on intentions. This will allow us to gain a deeper insight for future policy making and implementation of PVAS.

METHODOLOGY

This study was registered with National Medical Research Register (NMRR) and was approved by Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia (NMRR-14-483-20556). Respondents were briefed that their consent to participate is indicated by returning the completed questionnaire. For participants below 18 years, verbal consent was provided by any accompanying adult. We design a two-phase mixed methodology approach based on the Theory of Planned Behaviour (TPB) as the theoretical model. Attitudes, subjective norms and perceived behavioural control forms the basis of our Perspectives domain. These are the main TPB constructs.[18] We posit that patient knowledge and expectations about PVAS may also be significant predictors of intention and may also indirectly interact with the patient's perspective in affecting intentions.

The TPB is one of the most frequently cited and influential models for prediction of human social behaviour.[19] The TPB model has also been extensively used in pharmaceutical research. For instance; community pharmacists' intention to utilize an online prescription drug monitoring program.[20] community pharmacist's intention to provide Medicare medication therapy management services.[21] pharmacists' intention to report serious adverse drug events.[22] and community pharmacists' beliefs and intentions about the treatment of vaginal candidiasis with non-prescription medicines.[23]

Phase 1: Qualitative Exploration

We conducted semi-structured face-to-face interviews that explored the salient beliefs of patients in building intention to use PVAS. Thematic analysis is based on the TPB as our framework. Figure 1 illustrates the complete qualitative process and the types of questions asked within each TPB domain.

Emerging themes from the interview were used to generate a series of hypotheses which will be tested using a questionnaire instrument. Phase 1 conclusions

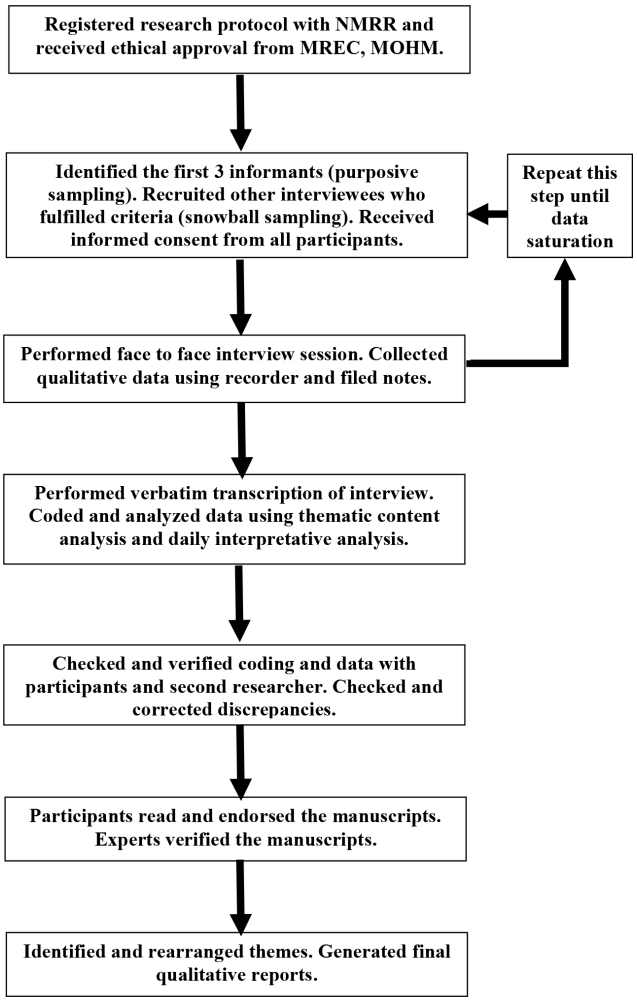

Figure 1: Flowchart for Phase 1 (Qualitative Interview).

will guide the formulation of research questions.[24] The qualitative study performed by Tan *et al* (2015) showed conclusively that five main themes emerged as significant predictors of intention which were attitudes, subjective norms, perceived behavioural control, knowledge and expectations in agreement with the TPB.[25] We now have a strong incentive to proceed to Phase 2 of the study.

Phase 2: Quantitative Phase

A questionnaire instrument named the "Pharmacy Value Added Services Questionnaire" or PVASQ was then developed and tested. Figure 2 illustrates the complete quantitative phase. Phase 2 involves; the pre-testing, the pilot testing and the final administration of PVASQ. See Appendix 2 for full PVASQ.

Face and content validity were performed by experts at the Department of Social and Administrative Pharmacy (DSAP), Universiti Sains Malaysia (USM). Malaysian nationals aging 13 years and above, able to read English or Malay language and have experience collecting their partial medicine supplies from the five health facilities in

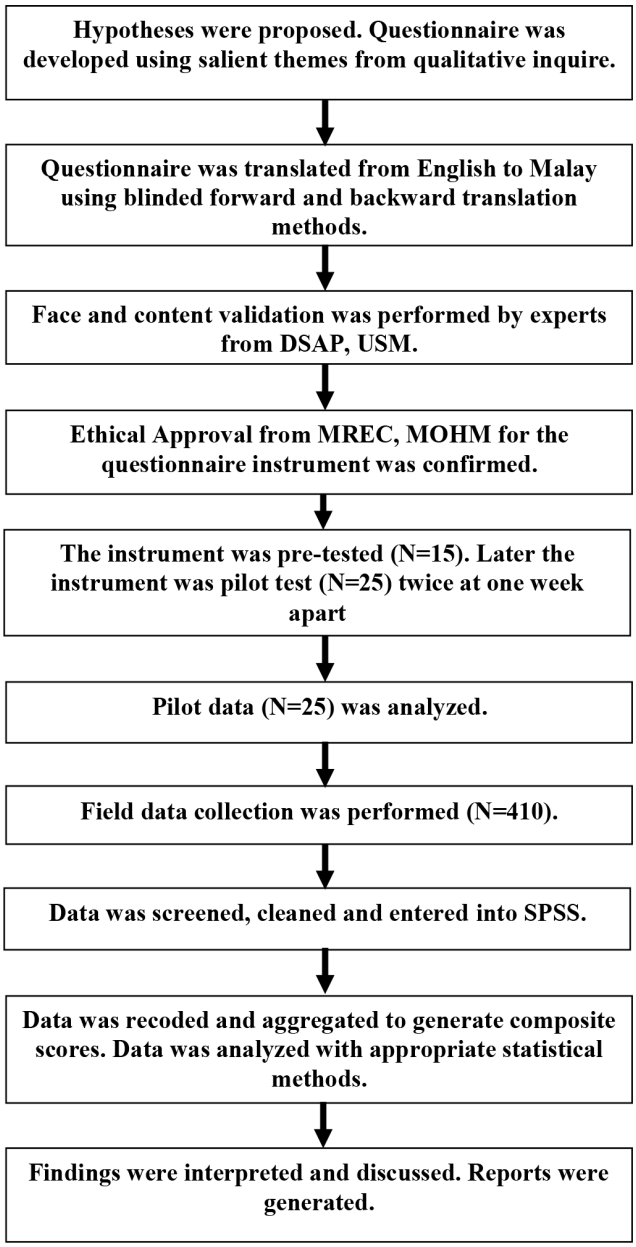

Figure 2: Flowchart for Phase 2 (Questionnaire Survey).

Seremban, in the state of Negeri Sembilan were suitable to participate. Illiterate participants were excluded.

Development and the establishment of the validity and reliability of PVASQ

PVASQ was constructed based on TACT principles (target, action, context and time principles) of the target behaviour using salient beliefs (themes) generated from earlier face-to-face interviews.[26] PVASQ contains 36 questions and is divided into five themes or four domains: Perspectives that include Subjective Norms, Perceived Behavioural Control, and Attitudes; Knowledge; Expectations; and Demographics (does not include sampling location). This is shown in Figure 3

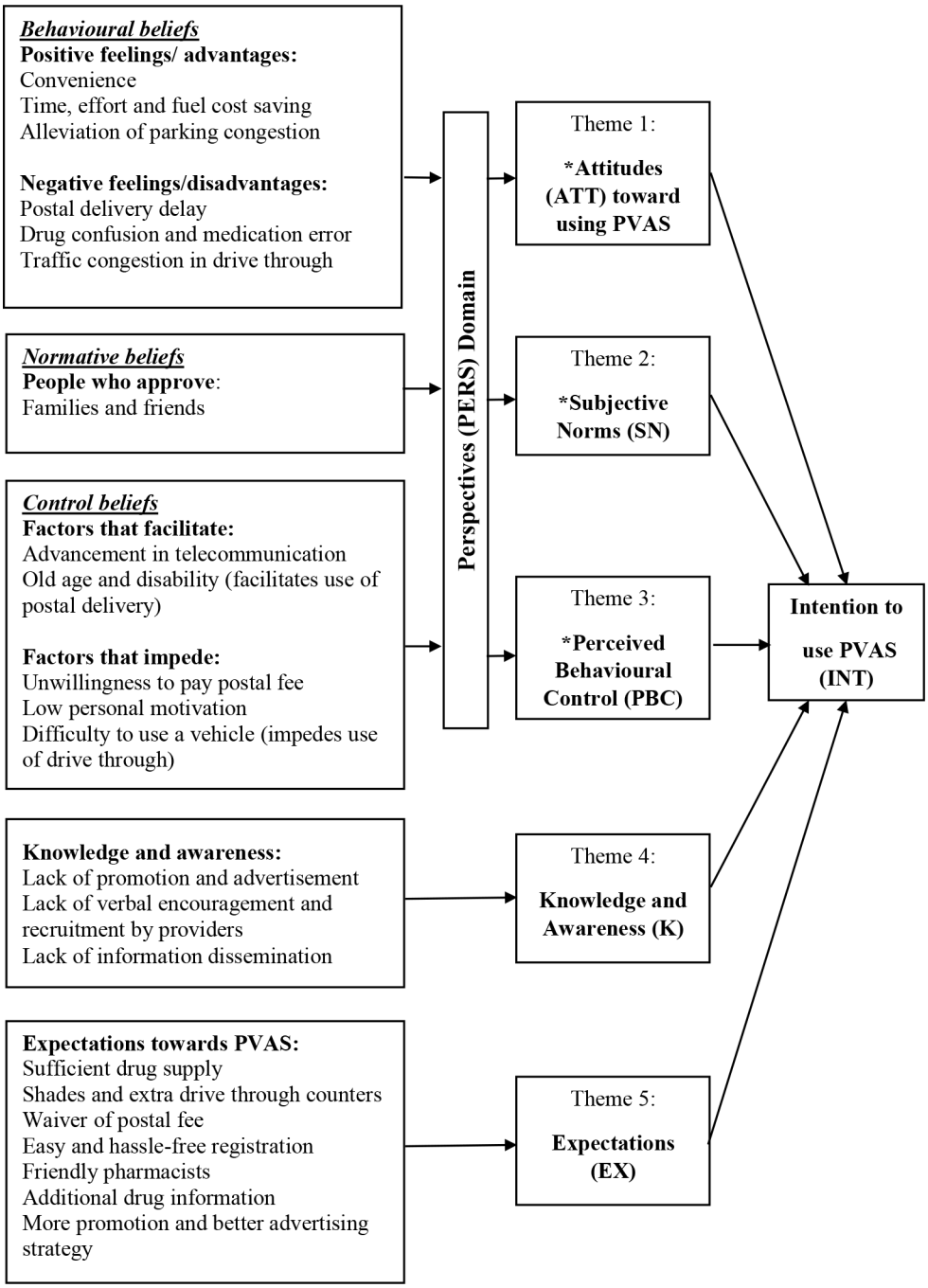

Figure 3: The extended Theory of Planned Behavior framework to understand patient's intention to adopt Pharmacy Value Added Services.

(adapted from.[27] It contains both dichotomous response options for Knowledge and 7-options unipolar Likert response scales for the other themes.

PVASQ was developed in English based on the salient themes generated in Phase 1 was pretested on 15 participants. A pilot study based a test-retest reliability (intra-rater reliability test) design was conducted on 25 participants. The final study was based on 410 participants. All participants were recruited from five centres (Table 1, Sampling Locations). For field data collection, 460 questionnaires were distributed from mid November 2014 to the end of December 2014 after accounting for 20% non-response rate, ± 5% of "true" population prevalence with a 95% level of confidence. A total of 410 useable questionnaires with no missing values were used for data entry and in the statistical analysis. Respondents' profiles can be found in Table 1.

Table 1: Respondent's Profile of the Study Population (N = 410).		
Demographics	*n*	**(%)**
Sampling Location		
Tuanku Ja'afar Seremban Hospital	92	22.4
Seremban Health Clinic	151	36.8
Ampangan Health Clinic	63	15.4
Senawang Health Clinic	56	13.7
Seremban 2 Health Clinic	48	11.7
D1: Gender		
Female	239	58.3
Male	171	41.7
D2: Age		
less than 17 year old	8	2.0
18-30 year old	115	28.0
31-40 year old	111	27.1
41-50 year old	71	17.3
51-60 year old	64	15.6
more than 61 year old	41	10.0
D3: Ethnicity		
Malay	287	70.0
Chinese	47	11.5
Indian	66	16.1
Others	10	2.4
D4: PVAS User		
No	306	74.6
Yes	104	25.4
D5: Medicine collection frequency in the past 6 months	11	2.7
0 time	250	61.0
1-2 times	103	25.1
3-4 times	41	10.0
5-6 times	5	1.2
> 7 times		
D6: Education		
No formal education	1	0.2
Primary school	18	4.4
Secondary school, 'O' Level	179	43.7
Diploma, STPM, 'A' levels, matriculation	140	34.1
Degree	43	10.5
Postgraduate	27	6.6
Others	2	0.5
D7: Occupational Sector		
Government agency	167	40.7
Private sector	93	22.7
Own business	41	10.0
Housewife	33	8.0
Student	20	4.9
Retired	47	11.5
Others	9	2.2
D8: Monthly Income		
No income	67	16.3
RM1-RM2000	145	35.4
RM2001-RM4000	142	34.6
RM4001-RM6000	39	9.5
>RM6000	17	4.1
D9: Number of medicines		
None	11	2.7
1-3 items	289	70.5
4-6 items	88	21.5
7-9 items	16	3.9
More than 10 items	6	1.5

The final sample of 410 is considered as good. The PVASQ has 29 items (variables) to test the TPB model operationally. Using the rule-of-thumb of the ratio 10:1.[28,29], the minimum sample size required for a sound factor analysis is 290 subjects as suggested by Comrey and Lee.[30] Our number of 410 exceeds these recommendations.

Data entry and analysis was performed using SPSS version 22 and EViews 8. Negatively worded responses were recoded. Composite measures or scores were computed for all six main constructs. Internal consistency of construct reliability was assessed using Cronbach's Alpha (α). We set α at 0.70 as the cut-off point.[31]

The chance correlated agreement reliability ($N = 25$) at two time points was calculated using Cohen's unweighted kappa ($\varkappa$) statistic for nominal scales and dichotomous knowledge items while the Intraclass Correlation Coefficient (ICC) was applied for interval scales; TPB constructs, knowledge and expectations scores.[32]

The ICC model used is the One-way random effects model, single measure. Acceptable $\varkappa$ is set at > 0.40 for moderate to almost perfect agreement.[33] and the ICC set at > 0.50 for moderate to good reliability.[34]

For Confirmatory Factor Analysis, we restrict the extracted factors to four based on the three TPB constructs and the fourth construct of expectations.[35] This "*A Priori* Criterion" is suitable for theory testing or hypothesis testing based on a theoretical model.[36] Items in the intention scale were not included in factor analysis because intention is a dependent variable in TPB model. The knowledge scale is unsuitable for factor analysis because binary variables cannot be expressed within factor models.[37] The ICC by test-retest is sufficient to indicate construct validity for the knowledge scale by establishing its stability and reliability over time.[38] We use Principal Axis Factoring with Varimax rotation. The detailed description of this stage can be found in Tan *et. al.*[39] Minimum acceptable statistical significance is set the cut-off point of $p < 0.05$ for all tests.

Multiple Regression

We began our analysis on the effect of the entire perspective (PERS) domain on the intention to adopt (INT) given by equation (1). We then further our estimation with the second more detailed TPB specification in equation (2). We estimate the following base models on the total scores of each *i*-th respondent for each questionnaire item based on our theoretical model of the Theory of Planned Behaviour in Figure 3 (Figure 3 for abbreviations). The base specifications for ordinary least squares estimation (OLS) are given by;

$$INT_i^{score} = \beta_0 + \beta_1 PERS_i^{score} + \beta_2 K_i^{score} + \beta_3 EX_i^{score} + \beta_4 Z_i + u_i \quad (1)$$

And;

$$INT_i^{score} + \beta_0 + \beta_1 SN_i^{score} + \beta_2 PBC_i^{score} + \beta_3 ATT_i^{score} + \beta_4 K_i^{score} + \beta_5 EX_i^{score} + \beta_6 Z_i + u_i \quad (2)$$

Where and is the vector of control variables. The controls consist of dummy and ordinal variables that represent demographic data. We utilize hetereoskedasticity-robust standard errors to calculate a hetereoskedasticity-robust *t* statistic based the seminal method proposed by White.[40] Expressions (1) and (2) are known as the direct effect model of the dependent variable *Y* and the independent variable *X* (Figure 4A).

Demographics Regressions

Should any of the categorical demographic controls be statistically significant, we can focus on performing the TPB regression with the specific control variable to isolate the exact demographic characteristic that is truly important for policy implications. As our control variables are categorical, ordinal or nominal, which is also called "dummy" variables, we can use the simple example of *Gender* to illustrate how isolate the exact characteristics that matter. *Gender* is a categorical variable with values of; 0 = Female, 1 = Male. We then regress the following;

$$INT_i^{score} = \beta_0 + \beta_1 SN_i^{score} + \beta_2 OC_i^{score} + \beta_3 ATT_i^{score} + \beta_4 Gender_i + u_i \quad (3)$$

The estimates of equation (3) can isolate which demographic characteristic is statistically significant and its effect on Intention while controlling for each TPB construct. The procedure is the same for any other control variable.

Partial Effects: The Moderating Role of Knowledge and Expectations on Perspectives

Moderation or Interaction occurs when the relationship between the variables *X* and *Y* in terms of size and sign

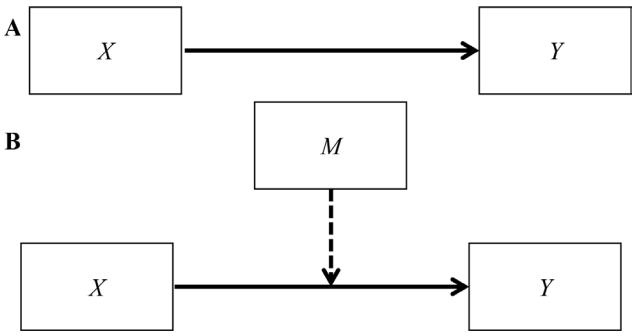

Figure 4A: Direct effect of *X* on *Y*.
Figure 4B: Moderating or Interaction effect of *M* on *X-Y*.

depends on a third variable, *M* we call the moderator variable as depicted in Figure 4B.[41] We analysed the role of knowledge and expectations as moderators through partial effects estimation. The full procedure for estimating partial effects or moderation models is described in Appendix 1.[42]

RESULTS

Reliability

PVASQ test-retest reliability ($N = 25$) has been earlier established by Tan and colleagues (2015b) by using Cronbach's alpha and Cohen's kappa. The authors clearly show that Cronbach's alpha for the pooled 29 items in both Test and Retest were $\alpha = 0.912$ and $\alpha = 0.908$ respectively. All TPB constructs plus knowledge and expectations scores have alpha values more than 0.70 in both Test and Retest. The kappa coefficients in the knowledge scale ranges from 0.503-0.905, indicating a moderate to almost perfect strength of agreement between test and retest for each individual item. The ICC was reported to be > 0.80 for all TPB constructs plus knowledge and expectations scores. Thus, test-retest ($N = 25$) reliability is established. ICC results are sufficient to establish validity of the dicotomous knowledge scale with ICC = 0.872 ($N = 25$, $p < 0.005$). Reliability for the final field study ($N = 410$) is established with $\alpha = 0.938$ for all pooled 29 items.

Confirmatory Factor Analysis

The Kaiser-Meyer-Olkin measure of sampling adequacy ($N = 410$) is 0.940 which is "excellent" and Bartlett's Test of Sphericity ($N = 410$) is significant ($p < 0.05$).[45,46] We conclude that there are correlations in the data set which is appropriate for factor analysis and therefore CFA is likely to yield distinctive and reliable latent factors. Table 2 displays the extracted communalities and loadings into four factors for all items in the TPB and expectation scales. Four factors were extracted with a cumulative explained variance of 71%. Varimax rotation of items showed strong loading (> 0.60) of seven items in one factor (Expectations) and significant loading levels (> 0.40) on the second factor (Attitudes), third factor (Perceived Behavioural Control) and fourth factor (Subjective Norms). Almost all 19 items were regrouped distinctively into the expected four factors except one item which loaded from the Attitudes factor into the Perceived Behavioural Control factor. The item "P8: Home delivery reduces transportation cost" has low extracted communalities (0.271) and loaded

Table 2: Survey items, communalities and their loadings on four factors Rotated Factor Matrix[a].

	Factors				Communalities
Survey items	ATT	SN	PBC	EX	Extraction[b]
P1 Using VAS to collect medicine is convenient.	0.759	0.202	0.242	0.213	0.721
P2 Using VAS saves my time.	0.773	0.224	0.267	0.237	0.775
P3 Using VAS is beneficial.	0.672	0.287	0.302	0.262	0.693
P7 Pharmacy Value Added services is not good. (negatively worded)	0.438	0.221	0.227	0.239	0.350
P4 Most people who are important to me think that I should use VAS.	0.475	0.494	0.308	0.181	0.597
P5 It is expected of me to use VAS.	0.300	0.749	0.191	0.256	0.752
P6 I am encouraged to use VAS.	0.345	0.594	0.289	0.179	0.588
P8 Home delivery reduces transportation cost.	0.197	-	**0.447**	0.151	0.271
P9 Using VAS to collect medicine is easy.	0.355	0.381	**0.622**	0.250	0.721
P10 I have no obstacles using VAS.	0.303	0.420	**0.536**	0.309	0.650
P12 The decision to use VAS is up to me.	0.234	0.108	**0.529**	0.216	0.392
P13 I am confident that I can use one of the VAS to collect medicine.	0.181	0.477	**0.568**	0.248	0.644
E1 Expect more efficient and hassle-free service.	0.265	0.247	0.109	**0.749**	0.704
E2 Expect sufficient medication supply.	0.108	0.235	0.203	**0.804**	0.754
E3 Expect friendly pharmacy staff.	0.196	0.122	0.188	**0.767**	0.677
E4 Expect more VAS promotion and announcement in clinics and hospitals.	0.209	-	0.173	**0.787**	0.699
E5 Expect additional medicine information.	0.162	0.220	0.195	**0.779**	0.720
E6 Expect simple and easy registration procedure.	0.242	0.122	0.161	**0.778**	0.705
E7 Expect big shades at drive through counter to prevent getting wet.	0.112	-	0.249	**0.722**	0.602

ATT = Attitudes; SN = Subjective Norms; PBC = Perceived Behavioural Control; EX = Expectations.
a. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 5 iterations.
b. Extraction Method: Principal Axis Factoring

inaccurately into the PBC factor instead of the ATT factor. Therefore, P8 is removed from the final regression analysis. All other items have extracted communalities above 0.30 and 15 items out of 19 items have extracted communalities > 0.60, therefore these items were retained for regression.

Bivariate Analysis

Descriptive statistics and Pearson correlation coefficients (Table 3) was generated with Bootstrapping employed on 1000 bootstrap samples. Correlations were computed for both composite scores of constructs and between each item. BCa confidence intervals was used to calculate the new 95% confidence interval due to skewness of the dataset.[47] All correlation coefficients between any two composite scores are positively correlated, moderate to strong and statistically significant at 1% (2-tailed). Similarly, inter-item correlations show all items are also moderately to strongly correlate except for Item P8 (Table 4). Thus, further validating the decision to exclude P8 from any further regression analysis. Only knowledge has weak correlations with all other composite measures and Item P8 with all other questionnaire items.[48]

Multiple Regression: The Determinants of Intention

The Kolmogorov-Smirnov test of normality indicates that all TPB, Knowledge and Expectation score variables are not approximately normally distributed at $p < 0.01$. We can therefore expect heteroscedasticity to exist. Thus, we utilize White's heteroscedasticity robust standard errors. Table 5 shows composite Perspectives and TPB regression models controlling for different variables and demographics.

We refer to Model 1 in Table 5 for the full estimation of equation 1 with all control variables. The degree of freedom for the *t*-test in regression is N-k-1 where N is the number of observations and k is the number of predictor variables (See Table 5).

Firstly, it was found that Perspectives is positively and significantly related to Intentions ($\beta = 0.245$, $t\ (397) = 20.42$, $p < 0.001$). Results also indicated that Knowledge is not significantly associated with Intentions ($\beta = 0.132$, $t\ (397) = 1.67$, $p = 0.0942$). Expectations is also found to be not significantly related to Intentions ($\beta = 0.002$, $t\ (395) = 0.11$, $p = 0.9092$). Of all the demographic variables, ethnicity is the only control variable that is negatively but significantly associated with Intentions ($\beta = -0.24$, $t\ (395) = -2.11$, $p = 0.035$).

Next, when we further our analysis in greater detail, it was found that Subjective Norms is positively and significantly related to Intentions ($\beta = 0.28$, $t\ (395) = 4.09$, $p < 0.001$). Results also indicated that Perceived Behavioural Control is positively and significantly associated with Intentions ($\beta = 0.55$, $t\ (395) = 2.13$, $p < 0.001$). Knowledge is also found to be positively and significantly related to Intentions ($\beta = 0.17$, $t\ (395) = 2.39$, $p = 0.018$). Results show that Expectation is positively and significantly associated with Intentions ($\beta = 0.04$, $t\ (395) = 2.00$, $p = 0.049$). Of all the demographic variables, ethnicity is the only control variable that is negatively but significantly associated with Intentions ($\beta = -0.35$, $t\ (395) = -2.99$, $p = 0.004$). However, it was found that Attitudes is negatively and not statistically

Table 3: Mean, Standard Deviations and Pearson Correlations among composite measures (N = 410) with Bootstrapping.

	Mean	S.D	INT	ATT	SN	PBC	K	EX
INT	16.71 [16.30-17.10]	3.672 [3.416-3.916]	1					
ATT	28.41 [27.82-28.96]	5.089 [4.774-5.365]	0.626*** [0.540-0.706]	1				
SN	16.49 [16.10-16.88]	3.647 [3.428-3.846]	0.729*** [0.670-0.785]	0.679*** [0.607-0.740]	1			
PBC	22.41 [21.97-22.94]	4.392 [4.155-4.610]	0.839*** [0.792-0.880]	0.717*** [0.653-0.775]	0.718*** [0.653-0.777]	1		
K	5.36 [5.22-5.50]	1.499 [1.397-1.601]	0.211*** [0.110-0.314]	0.146*** [0.042-0.240]	0.141*** [0.050-0.231]	0.161*** [0.067-0.251]	1	
EXP	44.18 [43.54-44.85]	6.090 [5.567-6.572]	0.534*** [0.456-0.606]	0.548*** [0.464-0.628]	0.503*** [0.428-0.574]	0.575*** [0.494-0.644]	0.129*** [0.034-0.226]	1

***Pearson Correlation is significant at the 0.01 level (2-tailed). Bootstrap results are based on 1000 bootstrap samples.
[ ] denotes for BCa 95% Confidence Interval.
BCa=Bias-corrected and accelerated.
INT = Intention, ATT = Attitude, SN = Subjective Norm , PBC = Perceived Behavioural Control, K = Knowledge, EX = Expectations

Table 4: Bootstrapped Pearson Inter-Item Correlations.

	P1	P2	P3	P4	P5	P6	P7	**P8**	P9	P10	P11	P12	P13	P14	P15	E1	E2	E3	E4	E5	E6	E7
P1	1																					
P2	0.735***	1																				
P3	0.707***	0.717***	1																			
P4	0.549***	0.626***	0.617***	1																		
P5	0.466***	0.504***	0.537***	0.634***	1																	
P6	0.517***	0.514***	0.535***	0.545***	0.679***	1																
P7	0.487***	0.544***	0.470***	0.385***	0.410***	0.409***	1															
P8	0.278***	0.327***	0.351***	0.353***	0.257***	0.285***	0.221***	1														
P9	0.550***	0.581***	0.594***	0.630***	0.558***	0.556***	0.435***	**0.431*** **	1													
P10	0.530***	0.528***	0.587***	0.564***	0.589***	0.519***	0.405***	**0.344*** **	0.713***	1												
P11	0.445***	0.480***	0.542***	0.585***	0.619***	0.602***	0.432***	**0.315*** **	0.731***	0.715***	1											
P12	0.399***	0.408***	0.375***	0.310***	0.345***	0.352***	0.317***	**0.372*** **	0.482***	0.456***	0.423***	1										
P13	0.416***	0.452***	0.496***	0.549***	0.543***	0.583***	0.397***	**0.340*** **	0.651***	0.667***	0.718***	0.443***	1									
P14	0.483***	0.484***	0.550***	0.555***	0.617***	0.585***	0.435***	**0.328*** **	0.689***	0.685***	0.789***	0.474***	0.762***	1								
P15	0.402***	0.430***	0.470***	0.505***	0.510***	0.535***	0.374***	**0.372*** **	0.606***	0.608***	0.675***	0.451***	0.707***	0.763***	1							
E1	0.450***	0.471***	0.465***	0.446***	0.459***	0.381***	0.367***	**0.257*** **	0.443***	0.483***	0.432***	0.283***	0.419***	0.443***	.416***	1						
E2	0.345***	0.394***	0.395***	0.355***	0.438***	0.362***	0.345***	**0.262*** **	0.475***	0.519***	0.472***	0.307***	0.455***	0.493***	.441***	0.808***	1					
E3	0.406***	0.375***	0.424***	0.358***	0.400***	0.311***	0.321***	**0.278*** **	0.447***	0.450***	0.361***	0.315***	0.367***	0.416***	.338***	0.700***	0.701***	1				
E4	0.382***	0.429***	0.424***	0.333***	0.361***	0.287***	0.339***	**0.213*** **	0.421***	0.432***	0.384***	0.315***	0.380***	0.429***	.394***	0.654***	0.702***	0.696***	1			
E5	0.371***	0.427***	0.429***	0.361***	0.475***	0.418***	0.358***	**0.220*** **	0.446***	0.459***	0.476***	0.380***	0.440***	0.503***	.472***	0.646***	0.702***	0.664***	0.752***	1		
E6	0.418***	0.413***	0.475***	0.390***	0.384***	0.344***	0.345***	**0.258*** **	0.417***	0.464***	0.360***	0.313***	0.374***	0.427***	.386***	0.699***	0.678***	0.706***	0.663***	0.729***	1	
E7	0.286***	0.353***	0.375***	0.291***	0.317***	0.335***	0.311***	**0.265*** **	0.373***	0.389***	0.366***	0.344***	0.385***	0.400***	.345***	0.576***	0.643***	0.617***	0.648***	0.681***	0.672***	1

*** *Pearson Correlation is significant at the 0.01 level (2-tailed). Bootstrapping based on 1000 bootstrap samples. Pearson correlation coefficients are similar for analysis with or without Bootstrapping at 1000 bootstrap samples.*

Table 5: Estimates of TPB Multiple Regressions with Robust Standard Errors (N = 410).

Regressor	Model	
	1	2
Intercept	**-0.6969** (1.035) *0.5011* [-2.731, 1.334]	**-0.1467** (0.9018) *0.8708* [-0.1920, 1.626]
Perspectives (score)	**0.2450** (0.0120) *0.0000**** [0.2217, 0.2682]	-
Knowledge (score)	**0.1321** (0.0790) *0.0942* [-0.0227, 0.2869]	**0.1645** (0.0682) *0.0164*** [0.0304, 0.2986]
Expectations (score)	**0.0363** (0.0237) *0.1258* [-0.0102, 0.0828]	**0.0398** (0.0196) *0.0434*** [0.0012, 0.0783]
Subjective Norms (score)	-	**0.2817** (0.0689) *0.0001**** [0.1462, 0.4172]
Perceived Behavioral Control (score)	-	**0.5462** (0.0446) *0.0000**** [0.4585, 0.6340]
Attitudes (score)	-	**-0.0708** (0.0537) *0.1879* [-0.1763, 0.0347]
Gender	-0.2136 (0.1888) *0.2586* [-0.5847, 0.1576]	**0.0861** (0.2040) *0.6734* [-0.3150, 0.4871]
Age	**-0.0854** (0.0852) *0.3165* [-0.2529, 0.0820]	**-0.0901** (0.0944) *0.3404* [-0.2757, 0.0955]
Ethnicity	**-0.2413** (0.1140) *0.0349*** [-0.4655, -0.1716]	**-0.3469** (0.1158) *0.0029**** [-0.5745, -0.1193]
Current use of VAS	**-0.0026** (0.0730) *0.9720* [-0.1461, 0.1409]	**0.0167** (0.0800) *0.8348* [-0.1406, 0.1741]
Frequency of medicines collections in the past 6 months	**0.0102** (0.1112) *0.9268* [-0.2084, 0.2288]	**0.0087** (0.1292) *0.9462* [-0.2454, 0.2628]
Educational status	**-0.1378** (0.1712) *0.4213* [-0.4744, 0.1987]	**-0.0481** (0.1594) *0.7631* [-0.3615, 0.2653]
Occupational sector	**-0.0337** (0.0549) *0.5393* [-0.1416, 0.0742]	**-0.0664** (0.0638) *0.2991* [-0.1918, 0.0591]

Continue...

Table 5: Cont'd.		
Monthly income	**-0.1717** (0.1456) *0.2391* [-0.4579, 0.1146]	**-0.1005** (0.1620) *0.5352* [-0.4190, 0.2179]
Current number of medicines prescribed	**0.1095** (0.1319) *0.4071* [-0.1499, 0.3689]	**0.1521** (0.1297) *0.2417* [-0.1029, 4071]
Adjusted *R*-square	0.7722	0.7470
R-square	0.7789	0.7557
Standard Error of Estimate	1.7524	1.8469
Log-Likelihood	-805.1617	-825.6700

*Note to Table 4 and 5: *** and ** denotes significance at 1% and 5%. Figures in* ***boldface*** *denotes the unstandardized coefficients (β). Figures in italics denotes p-values. Figures in parentheses (·) denote heteroscedasticity-robust standard errors and [·] denote 95% confidence intervals. All models excluded item P8 in summation of the Attitude composite score.*

Table 6: Estimates of Ethnicity Effects on Intention with Robust Standard Errors (N = 410).				
Regressor	**Model**			
	1	**2**	**3**	**4**
Intercept	0.0977 (0.5498) *0.8590* [-0.9831, 1.1786]	0.5201 (0.5849) *0.3745* [-0.6298, 1.6699]	0.5724 (0.5213) *0.2728* [-0.4524, 1.5973]	0.4280 (0.5535) *0.4398* [-0.6600, 1.5160]
Subjective Norms (score)	0.2839 (0.0666) *0.0000**** [0.1530, 0.4148]	0.2801 (0.0688) *0.0001**** [0.1449, 0.4153]	0.2794 (0.0669) *0.0000**** [0.1478, 0.4110]	0.2773 (0.0679) *0.0001**** [0.1439, 0.4108]
Perceived Behavioral Control (score)	0.5615 (0.0411) *0.0000**** [0.4806, 0.6424]	0.5587 (0.0432) *0.0000**** [0.4738, 0.6437]	0.5694 (0.0418) *0.0000**** [0.4874, 0.6515]	0.5623 (0.0427) *0.0000**** [0.4784, 0.6462]
Attitudes (score)	-0.0394 (0.0423) *0.3519* [-0.1225, 0.0437]	-0.0322 (0.0415) *0.4386* [-0.1138, 0.0494]	-0.0390 (0.0419) *0.3529* [-0.1213, 0.0434]	-0.0313 (0.0415) *0.4499* [-0.1128, 0.0501]
Malays	0.6639 (0.2354) *0.0050**** [0.2011, 1.1267]	-	-	-
Chinese	-	-0.3220 (0.3765) *0.3929* [-1.0622, 0.4181]	-	-
Indian	-	-	-0.7714 (0.2836) *0.0068**** [-1.3290, -0.2140]	-
Others	-	-	-	-0.1062 (0.6184) *0.8637* [-1.3218, 1.1094]
Adjusted *R*-square	0.7420	0.7359	0.7412	0.7352
R-square	0.7446	0.7356	0.7437	0.7378
Standard Error of Estimate	1.8649	1.8869	1.8682	1.8896
Log-Likelihood	-834.7723	-839.5616	-835.4826	-840.1487

In the original formulation, Ethnicity is a categorical variable with values of; 1 = Malay, 2 = Chinese, 3 = Indian, 4 = Other, that represent these ethnic groups. We re-categorize Ethnicity into four separate dummy variables for each ethnic group. For instance, 1 = Malay, 0 = Non-Malay; 1 = Chinese, 0 = Non-Chinese; 1 = Indian, 0 = Non-Indian; and 1 = others, 0 = Non-others. Regression is per equation (3) by replacing Gender with Ethnicity.

Table 7: Estimates of Partial Effects with Robust Standard Errors (N = 410).				
Regressor	**Model**			
	1	**2**	**3**	**4**
Intercept	**-1.839** (2.032) *0.3662* [-5.8345, 2.1569]	**-0.5269** (0.8441) *0.5328* [-2.1865, 1.1326]	**10.8655** (3.5364) *0.0023* [3.9130, 17.8180]	**-2.3324** (0.7799) *0.0030* [-3.8656, -0.7992]
Perspectives (score)	**0.2477** (0.0221) *0.0000**** [0.2042, 0.2912]	**0.2311** (0.0093) *0.0000**** [0.2129, 0.2493]	**0.0588** (0.0483) *0.2239* [-0.036, 0.1537]	**0.2259** (0.0093) *0.0000**** [0.2076, 0.2442]
Knowledge (score)	**0.3136** (0.3265) *0.3374* [-0.3283, 0.9555]	**0.0690** (0.0627) *0.2720* [-0.0543, 0.1924]	**0.0826** (0.0655) *0.2082* [-0.0462, 0.2113]	**0.0826** (0.0655) *0.2082* [-0.0462, 0.2113]
Expectations (score)	**0.0031** (0.0214) *0.8858* [-0.0390, 0.0451]	**0.0031** (0.0214) *0.8858* [-0.0390, 0.0451]	**-0.2478** (0.0712) *0.0006**** [-0.3877, -0.1079]	**0.0509** (0.0245) *0.0379*** [0.0029, 0.0990]
$(PERS_i^{adpc})(K_i^{adpc})$	**-0.0031** (0.0039) *0.4288* [-0.0108, 0.0046]	-	-	-
$(PERS_i^{adpc} - \overline{PERS^{adpc}})(K_i^{adpc} - \overline{K^{adpc}})$	-	**-0.0031** (0.0039) *0.4288* [-0.0108, 0.0046]	-	-
$(PERS_i^{adpc})(EX_i^{adpc})$	-	-	**0.0038** (0.0011) *0.0003**** [0.0017, 0.0058]	-
$(PERS_i^{adpc} - \overline{PERS^{adpc}})$ $(EX_i^{adpc} - \overline{EX^{adpc}})$	-	-	-	**0.0038** (0.0011) *0.0003**** [0.0017, 0.0058]
Ethnicity	**-0.2365** (0.1145) *0.0395*** [-0.4616, -0.0114]	**-0.2365** (0.1145) *0.0395*** [-0.4616, -0.0114]	**-0.2406** (0.1122) *0.0326*** [-0.4612, -0.0200]	**-0.2406** (0.1122) *0.0326*** [-0.4612, -0.0200]
δ Coefficients *t*-test for partial effects				
$t_{K\ on\ INT\ of\ \overline{PERS}}$		1.101		
$t_{PERS\ on\ INT\ of\ K}$		24.96***		
$t_{EX\ on\ INT\ of\ \overline{PERS}}$			2.08**	
$t_{PERS\ on\ INT\ of\ \overline{EX}}$			24.24***	
Adjusted *R*-square	0.7720	0.7720	0.7788	0.7788
R-square	0.7792	0.7793	0.7856	0.7856
Standard Error of Estimate	1.7533	1.7533	1.7271	1.7271
Log-Likelihood	-804.8592	-804.8592	-798.6861	-798.6861

*Notes to Table 7: *** and ** denotes significance at 1% and 5%. Figures in* ***boldface*** *denotes the unstandardized coefficients (β). Figures in italics denotes p-values. Figures in parentheses (·) denote hetereoskedasticity-robust standard errors and [·] denote 95% confidence intervals. All models excluded item P8 in summation of the Attitude composite score. Only statistically significant estimates of Demographics; Ethnicity, is shown for simplicity. All other demographics remain not statistically significant like Table 5. δ Coefficients t-test for partial effects are calculated as given at 5% significance;*

$$t_{K\ on\ INT\ of\ \overline{PERS}} = \left(\frac{0.3136 + (-0.0031)(78.99)}{0.062735}\right) = 1.101 < 1.96 \qquad t_{EX\ on\ INT\ of\ \overline{PERS}} = \left(\frac{-0.2478 + (0.0038)(78.99)}{0.024449}\right) = 2.08 > 1.96,$$

$$t_{PERS\ on\ INT\ of\ K} = \left(\frac{0.2478 + (-0.0031)(53634)}{0.062735}\right) = 24.96 > 1.96, \qquad t_{PERS\ on\ INT\ of\ \overline{EX}} = \left(\frac{0.05880 + (0.0038)(44.18)}{0.0093}\right) = 24.94 > 1.96$$

significant in association with Intentions (β = -0.07, t (395) = -1.34, p = 0.190).

Ethnicity was revealed to be a significant determinant of intention at 5% significance (Table 5). We isolate the exact ethnic group with further dummy regressions. The results from demographics indicate that Malaysians of Indian ethnicity was negatively related to intention to adopt PVAS at 1% significance while Malays had positive intentions at 1% significance. Ethnic Chinese and other races were negatively related to intentions but were not statistically significant (See Table 6).

Moderation: The Partial Effects of Knowledge and Expectations

Table 7 shows that moderation effects were statistically significant for expectations with p-values from Column 3 and 4 less than 0.001. However, knowledge does not interact with perspectives. Table 7 also reveals interesting results from the δ coefficients t-tests for partial effects of knowledge and expectations on perspectives. Results show again that knowledge has no partial effects on intention with the individual with average perspective scores (Figure 5). Interestingly, perspectives have a 1% statistically significant effect at increasing intention for persons of average knowledge levels. This is an interesting result as we do not expect that perspectives to moderate knowledge. This finding illustrates the strength of our deeper partial effects analysis compared to standard interaction or moderation regressions.

We also find that expectations can increase intention for individuals with average perspectives at 5% significance which we expect (Figure 6). Finally, our final interesting result shows that perspectives moderate the relationship between intention and expectation on individuals with average expectations.

Results of the moderation analysis confirmed the moderating role of expectations in the relation between perspectives and intentions. Knowledge plays no role in moderating the relationship between intentions and perspectives. More importantly, results suggest a self-reinforcing feedback loop between Expectations-Perspectives-Intention that suggest a closed cognitive nexus which policy makers should pay much attention too (Figure 7).

Finally, the results of the robustness test confirm that the results in Table 7 is robust to latent relationships or any misspecification. Results from Column 4, 5 and 6 of Table 8 confirm at 5% significance the interacting relationship between expectations and intentions even after the construct variable scores have been orthogonalized.

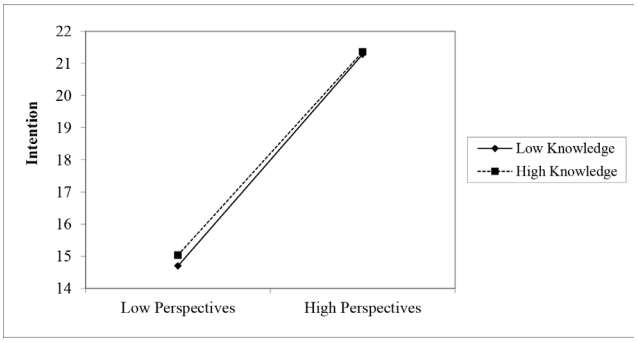

Figure 5: Interaction effects between Knowledge and Perspectives. The standard moderation analysis can be misleading with results in Models 1 and 2 of Table 7 plus the graphical illustration

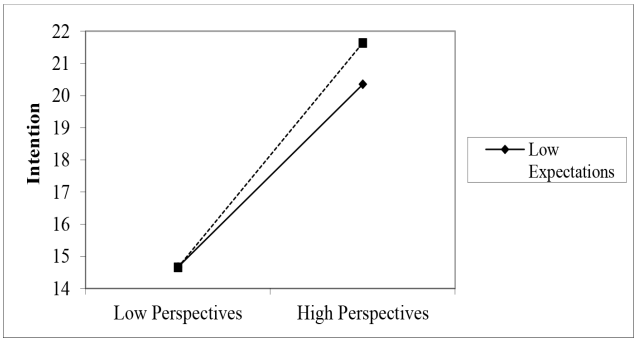

Figure 6: Interaction effects between Expectations and Perspectives. Respondents with higher Expectations seem to increase Intentions for those who have more positive Perspectives with Low Expectations group clearly different from High Expectations especially at above average Perspectives scores.

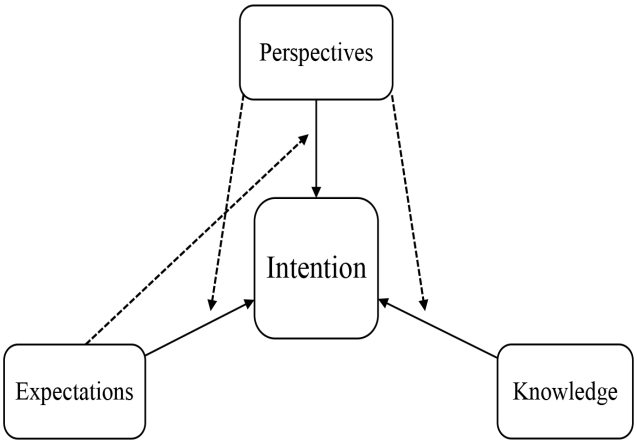

Figure 7: The Perspectives, Expectations, and Knowledge nexus of Intention. Perspectives moderate the Expectations-Intention and Knowledge-Intention relationship while Expectations moderate the Perspectives-Intention relationship. The relationship between Expectation-Perspectives-Intention looks like a self-reinforcing feedback loop.

Table 8: Robust Estimates of Partial Effects with Robust Standard Errors (N = 410).

Regressor	Model					
	1	2	3	4	5	6
Intercept	**-0.6980** (0.9020) *0.4395* [-2.4714, 1.0754]	**-0.6928** (0.8982) *0.4409* [-2.4586, 1.0730]	**-0.7369** (0.9436) *0.4353* [-2.5919, 1.1181]	**-0.4046** (0.8994) *0.6531* [-2.1728, 1.3637]	**-0.2118** (0.9624) *0.8259* [-0.482, 1.578]	**-1.1791** (0.8330) *0.1577* [-2.8168, 0.4587]
Perspectives (score)	**0.2361** (0.0091) *0.0000**** [0.2181, 0.2540]	**0.2304** (0.0093) *0.0000**** [0.2123, 0.2487]	**0.2332** (0.0092) *0.0000**** [0.2151, 0.2513]	**0.2262** (0.0086) *0.0000**** [-0.2090, 0.2434]	**0.2297** (0.0092) *0.0000**** [-0.482, 1.578]	**0.2182** (0.0092) *0.0000**** [0.2000, 0.2363]
Knowledge (score)	**0.0737** (0.0639) *0.2496* [-0.0520, 0.1994]	**0.0891** (0.0694) *0.1997* [-0.0473, 0.2255]	**0.0726** (0.0636) *0.2543* [-0.0524, 0.1976]	**0.0785** (0.0664) *0.2377* [-0.0520, 0.2089]	**0.0787** (0.0665) *0.2370* [-0.482, 1.578]	**0.0688** (0.0666) *0.3029* [-0.0623, 0.1998]
Expectations (score)	**-0.0032** (0.0208) *0.8796* [-0.0441, 0.03780]	**0.0061** (0.0215) *0.7748* [-0.0360, 0.00483]	**0.0030** (0.0214) *0.8895* [-0.0390, 0.0449]	**0.0103** (0.0199) *0.6052* [-0.0289, 0.0495]	**-0.0017** (0.0209) *0.9330* [-0.482, 1.578]	**0.0421** (0.0230) *0.0675* [-0.0031, 0.0872]
$(K_i^{'})(PERS_i^{'})$	**3.45 × 10^{-5}** (2.30 × 10-5) *0.1348* [-7.97 × 10^{-5}, 1.07 × 10^{-5}]					
$(PERS_i^{'})$ $(K_i^{****} \square \overline{K^{****}})$		**-0.0002** (8.55 × 10^{-5}) *0.0706* [-0.0003, 1.31 × 10^{-5}]				
$(K_i^{'})$ $(PERS_i^{****} \square \overline{PERS^{****}})$			**-0.0008** (0.0010) *0.4316* [-0.0029, 0.0012]			
$(EX_i^{'})$ $(PERS_i^{'})$				**8.70 × 10^{-5}** (4.08 × 10^{-5}) *0.0335*** [6.81× 10^{-8}, 1.67× 10^{-6}]		
$(PERS_i^{'})$ $(EX_i^{****} \square \overline{EX^{****}})$					**3.75 × 10^{-5}** (1.84 × 10^{-5}) *0.0425*** [1.28 × 10^{-6}, 7.36 × 10^{-5}]	
$(EX_i^{'})$ $(PERS_i^{****} \square \overline{PERS^{****}})$						**8.70 × 10^{-5}** (3.05 × 10^{-5}) *0.0046*** [2.70 × 10^{-5}, 0.0002]
Adjusted *R*-square	0.7737	0.7742	0.7720	0.7736	0.7735	0.7762
R-square	0.7809	0.7814	0.7793	0.7808	0.7807	0.7833
Standard Error of Estimate	1.7469	1.7448	1.7532	1.7470	1.7473	1.7370
Log-Likelihood	-803.3653	-802.8735	-804.8407	-803.3912	-803.4690	-801.0253

Notes to Table 8: Notations are like Table 7. All models excluded item P8. For simplicity, all Demographics is not shown in this table. Like Table 6, only estimates of Ethnicity are statistically significant at 5%. All other demographics remain not statistically significant like Table 5.

DISCUSSION

Perspectives as a cognitive domain by itself was found to be a strong predictor of intentions. The strongest predictor of intentions is perceived behavioural control followed by subjective norms. Surprisingly, attitudes were not statistically significant. However, it is clinically significant as regression shows that a 1% increase in positive attitudes predicts a 7.1% increase in intentions. This may be due to unavoidable response bias to give socially desirable responses on attitude questions surveyed on government servants (41% of the respondents are public employees). Acquiescence bias might also have occurred due to deference or respect for a government research investigator, hence mostly scoring positively high on the attitude scale.[49] It noteworthy that in this survey, 70% of the respondents were Malay participants. Our results show that Malay respondents showed a significant higher acquiescence response style and positive extreme responses.[50] These factors may explain the significance of ethnicity as a predictor of intentions. Ethnicity was also revealed to be significant predictor of PVAS adoption. It is a cause for concern that Malaysians of Indian origins were found to be significant in determining PVAS adoption. More worrying is that negative coefficient estimates suggests that Malaysian Indians would reject the adoption of PVAS even when offered the service. Malays were found to be positive in their intentions to adopt PVAS. The fact that most Malay respondents being public servants may explain their acceptance of PVAS in this study.

The findings on the role of moderators are robust. Our application of the *Frisch-Waugh Theorem* ensures that there are no latent effects or unobserved variables that can further explain intention to adopt PVAS. This suggests that policy makers should focus on managing patient knowledge and expectations first with an emphasis on generating positive overall perspectives. We should obviously increase their knowledge levels but also motivate them to have high expectations and provide services that meet those high expectations of service quality. Particularly, implementation of new pharmaceutical public health programs should pay deeper attention to the cognitive feedback loop between Expectations, Perspectives, and Intention. Overall, the moderating effects of expectations and perspectives suggest that we can start by creating a strategy focused on increasing the PVAS adoption rate on patients with average knowledge levels, neutral expectations and impartial perspectives. These are individuals which we may term as "fence sitters".

CONCLUSION

The results conclusively show that the key predictors of intention to adopt PVAS are perspectives, knowledge and expectations. Furthermore, perspectives moderates both expectations and knowledge relationships with intention to adopt PVAS while expectations moderate the perspective-intention relationship.

It is suggested that to increase the intention to use PVAS, patient's knowledge must be improved through the right media while further work be undertaken to improve their perspectives on PVAS. Individuals with positive perspectives will have a higher propensity to adopt PVAS when they have better knowledge and having their expectations of service quality met.

The findings that expectations, perspectives and intention operate as a self-reinforcing cognitive loop informs policy makers that to increase the adoption rate of PVAS, the pharmacy facilities should strive to maximize their effort to meet the expectations of the patients. Efficient services, adequate medicine supplies, politeness and friendliness of staffs, more PVAS promotion and drug education, simpler registration procedures and comfortable drive through services will generate positive perspectives which may increase the adoption rate of PVAS in this country. Our results provide evidence that patients who already possess low expectations, poor knowledge and negative perspectives are highly unlikely to adopt PVAS soon. Future research and policy can be geared to address this issue.

Lastly, ethnicity was also found to be a significant predictor to predict intention to adopt PVAS in this study with Malaysians of Indian ethnic backgrounds found to be generally averse to PVAS. This we leave to future research to uncover the reasons behind this result.

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CONFLICT OF INTEREST

We declare no conflict of interests. The views presented in this article represent only those of the authors. The usual disclaimer applies.

ABBREVIATIONS

MOHM: Ministry of Health Malaysia; PSD: Pharmaceutical Services Division; PVAS: Pharmacy value-added

services; SMS: short messaging service; UMP 1Malaysia: Drug postal delivery service in Malaysia; *Pos Malaysia*: Malaysia's national postal service provider; *PosLaju*: Malaysia's national courier service provider.

LIMITATIONS

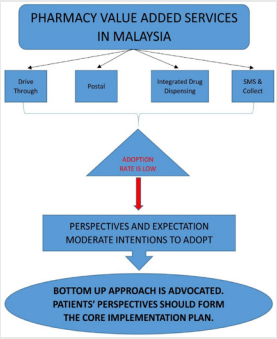
This study is limited by its cross-sectional nature which does not allow the researchers to examine how perspectives change over time. Being a questionnaire survey this study may suffer from bias in the constructs.

REFERENCES

1. Salmah B. Malaysia: Pharmacy Transformation Planning-Reform for Universal Access to Medicines. Asia Pacific Conference On National Medicines Policies. Sydney, Australia; 2012.
2. Manan NA. Value Added Service of Dispensing Medicines. [Internet]. 2014 [cited 2015 Oct 22].
3. Valluri S, Seoane-Vazquez E, Rodriguez-Monguio R, Szeinbach SL. Drug utilization and cost in a Medicaid population: A simulation study of community vs. mail order pharmacy. BMC Health Serv Res. 2007;7(1):122.
4. Lin Y-F, Lin Y-M, Sheng L-H, Chien H-Y, Chang T-J, Zheng C-M, *et al*. First drive-through pharmacy services in Taiwan. J Chin Med Assoc. 2013;76(1):37–41.
5. McMillan SS, Sav A, Kelly F, King MA, Whitty JA, Wheeler AJ. Is the pharmacy profession innovative enough?: meeting the needs of Australian residents with chronic conditions and their carers using the nominal group technique. BMC Health Serv Res. 2014;14(1):476.
6. Whitty JA, Kendall E, Sav A, Kelly F, McMillan SS, King MA, *et al*. Preferences for the delivery of community pharmacy services to help manage chronic conditions. Res Social Adm Pharm. 2015;11(2):197-215.
7. Sadek MM, Elnour AA, Al Kalbani NMS, Srikanth AB, Baraka MA, Aziz AMA, *et al*. Community pharmacy and the extended community pharmacist practice roles: The UAE experiences. Saudi Pharm J. 2016;24(5):563-70.
8. Fitzgerald N, Youngson E, Cunningham S, Watson M, Stewart D. Support for community pharmacy-based alcohol interventions: a Scottish general public survey. Public Health.2015;129(11):1431-8.
9. Babar Z, Zaini NR, Yee CW. U.-D., and Harm Reduction Program and Methadone Poisoning: Implications for Pediatric Public Health in Malaysia. J Pharm Pract. 2006;19(5):280-1.
10. Rayes IK, Hassali MA, Abduelkarem AR. The role of pharmacists in developing countries: The current scenario in the United Arab Emirates. Saudi Pharm J SPJ Off Publ Saudi Pharm Soc.; 2015;23(5):470-4.
11. MOHM. Annual Report Ministry of Health Malaysia [Internet]. 2011 [cited 2015 Aug 28].
12. MOHM. Country Health Plan, c. [Internet]. 2015 [cited 2015 Aug 28].
13. Saramunee K, Krska J, Mackridge A, Richards J, Suttajit S, Phillips-Howard P. General public's views on pharmacy public health services: current situation and opportunities in the future. Public Health. 2015;129(6):705-15.
14. Nagya RM. Effects of Schooling on Obesity: Is Health Knowledge a Moderating Factor? Educ Econ. 2001;9(2):129-37.
15. Conner M, Povey R, Sparks P, James R, Shepherd R. Moderating role of attitudinal ambivalence within the theory of planned behaviour. Br J Soc Psychol. 2003;42(1):75-94.
16. Meinhold JL, Malkus AJ. Adolescent Enviromental Behaviors: Can Knowledge, Attitudes, and Self Efficacy Make a Difference? Environ Behav. 2005;37(4):511-32.
17. Nash SG, McQueen A, Bray JH. Pathways to adolescent alcohol use: family environment, peer influence, and parental expectations. J Adolesc Health. 2005;37(1):19–28.
18. Ajzen I. The Theory of Planned Behavior. Organ Behav Hum Decis Process. 1991;50(2):179-211.
19. McEachan RR, Conner M, Taylor NJ, Jane LR. Sep). Prospective prediction of health-related behaviours with the Theory of Planned Behaviour: a meta-analysis. Health Psychol Rev. 2011;5(2):97-144.
20. Fleming M, Barner J, Brown C, Shepherd M, Strassels S, Noval S. Using the theory of planned behavior to examine pharmacists' intention to utilize a prescription drug monitoring program database. Res Soc Adm Pharm. 2014;10(2):285-96.
21. Herbert KE, Urmie JM, Newland BA, Farris KB. Prediction of pharmacist intention to provide Medicare medication therapy management services using the theory of planned behavior. Res Social Adm Pharm. 2006;2(3):299–314.
22. Gavaza P, Brown C, Lawson K, Rascati K, Wilson J, Steinhardt M. Examination of pharmacists' intention to report serious adverse drug events (ADEs) to the FDA using the theory of planned behavior. Res Soc Adm Pharm. 2011;7(4):369-82.
23. Walker A, Watson M, Grimshaw J, Bond C. Applying the theory of planned behaviour to pharmacists' beliefs and intentions about the treatment of vaginal candidiasis with non-prescription medicines. Fam Pract. 2004;21(6):670-6.
24. Tashakkori A, Teddlie C. Integrating Qualitative and Quantitative Approaches to Research. In: Bickman L, Rog D., editors. The Sage Handbook of Applied Social Research. 2nd ed. Thousand Oaks, California: Sage Publications; 2009. p. 283–371.
25. Tan CLH, Hassali MA, Saleem F, Shafie AA, Aljadhay H, Gan VBY. Building intentions with the theory of planned behaviour: a qualitative assessment of salient beliefs about pharmacy value added services in Malaysia. Heal Expect. 2016;19(6)1251-25.
26. Francis JJ, Eccles MP, Johnston M, Walker A, Grimshaw J, Foy R, *et al*. Constructing questionnaires based on the Theory of Planned Behaviour: A manual for health services researchers. 2004.
27. Tan CLH. Assessment of Public's Knowledge and Perspectives on Pharmacy Value Added Services Provided by Government Health Facilities in Malaysia. MSc Thesis. Universiti Sains Malaysia; 2015.
28. Nunnally J. Psychometric theory. New York: McGraw-Hill; 1978.
29. Kass RA, Tinsley H. Factor analysis. J Leis Res. 1979;11:120-38.
30. Comrey A, Lee H. Course in Factor Analysis. 2nd ed. Hillsdale, NJ: Erlbaum; 1992.
31. DeVellis RF. Scale development: Theory and applications. 2nd ed. Thousand Oaks, California: Sage; 2003.
32. Gwet KL. Computing inter-rater reliability and its variance in the presence of high agreement. Br J Math Stat Psychol. 2008;61(Pt 1):29-48.
33. Landis JR, Koch GG. The measurement of observer agreement for categorical data. Biometrics. 1977;33(1):159-74.
34. Portney LG, Watkins MP. Foundations of Clinical Research: Applications to Practice. 2nd ed. Upper Saddle River, NJ: Prentice Hall Health; 2000.
35. Field A. Discovering Statistics (and sex, drugs and rock "n" roll). 2nd ed. London: Sage; 2005.
36. Hair JF, Black WC, Babin BJ, Anderson RE. Multivariate Data Analysis: A Global Perspective. Upper Saddle River, NJ: Pearson Education; 2010.
37. Kim JO, Mueller CW. Factor Analysis: Statistical Methods and Practical Issues. Newburry Park, California: Sage Publications; 1978.
38. Fleiss JL, Cohen J. The equivalence of weighted kappa and the intraclass correlation coefficient as measures of reliability. Educ Psychol Meas. 1973;33(3):613-9.
39. Tan CL, Hassali MA, Saleem F, Shafie AA, Aljadhey H, Gan VB. Development, test-retest reliability and validity of the Pharmacy Value-Added Services Questionnaire (PVASQ). Pharm Pract (Granada). 2015;13(3):598.
40. White H. Covariance Matrix Estimator and a Direct Test for Heteroskedasticity. Econometrica. 1980;48:817-38.
41. Hayes AF. Chapter Introduction. Introduction to Mediation Moderation and Conditional Process Analysis Approach. New York: Guilford Press; 2013. p. 1-20.
42. Wooldrige JM. Introductory Econometrics: A modern apporach. 5th ed. Mason, OH 45040: South-Western; 2013.
43. Ragnar F, Waugh F V. Partial Time Regressions as Compared with Individual Trends. Econometrica. 1933;1:387-401.
44. Balli HO, Sorensen BE. Interaction effects in econometrics. Empir Econ. 2013;45:583-603.
45. Kaiser HF. A second generation little jiffy. Psychometrika.;35(4):401-15.
46. Kaiser HF. An index of Factorial Simplicity. Psychometrika. 1974;39(1):31-6.

47. Carpenter J, Bithell J. Bootstrap confidence intervals: when, which, what? A practical guide for medical statisticians. Stat Med. 2000;19(9):1141-64.
48. Dancey C, Reidy J, Using S. Statistics Without Maths for Psychology for Windows. 2004.
49. Javeline D. Response Effects in Polite Cultures. A test of Acquiescence in Kazakhstan. Public Opin Q. 1999;63(1):1-28.
50. Harzing AW. Response Styles in Cross-national Survey Research: A 26-country study. Int J Cross Cult Manag. 2006;6(2):243-66.

PICTORIAL ABSTRACT



SUMMARY

- PVAS is an important service to improve clinical outcomes by improving compliance, monitoring and even information dissemination.
- However, adoption rates are low and therefore hampering the achievement of national health policy goals.
- We explore the key determinants and moderators of successful implementation of new public pharmaceutical services.
- Perspectives and expectations are found to exert significant partial effects on intentions.
- We find that a significant self-reinforcing feedback loop exists between Expectations-Perspectives-Intentions.

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