JPHSR Journal of Pharmaceutical Health Services Research

Journal of Pharmaceutical Health Services Research, 2021, Vol 12, 531–538
https://doi.org/10.1093/jphsr/rmab048
Research Paper
Advance Access publication 19 October 2021

OXFORD

Research Paper

Moderating effects of trustworthiness between pharmacists and physicians: using partial least squares

Mohsen Ali Murshid[1,2,*], Zurina Mohaidin[2], Mohammad Zayed[2] and Mohammed A. Al Doghan[3]

[1]Faculty of Administrative Sciences, Thamar University, Dhamar, Yemen
[2]Graduate School of Business, Universiti Sains Malaysia, Penang, Malaysia
[3]School of Business, King Faisal University, Ahsa, Saudi Arabia

*Correspondence: Mohsen Ali Murshid, Graduate School of Business, Universiti Sains Malaysia, 11800, Penang, Malaysia. Tel: +60-17-410-7275; Email: mohsen092@gmail.com

Received July 3, 2021; Accepted August 23, 2021.

Abstract

Objectives Trustworthiness (TRS) is an essential factor that drives pharmacist–physician collaboration (PPC), which, in turn, improves prescribing behaviour. This study examines the moderating effect of TRS on the relationship between pharmacist expertise, PPC and prescribing decisions of physicians (PPD).

Methods A total of 393 usable data were collected from selected physicians using a structured questionnaire form. Partial least squares structural equation modelling was adopted for data analysis.

Key findings The result shows that TRS does not moderate the relationship between pharmacist expertise power and PPD, although the relationship is stronger with higher TRS ($\beta = 0.054$, $t = 0.483$, $P > 0.05$). As expected, the relationship between PPC and PPD is stronger at high TRS ($\beta = 0.137$, $t = 1.653$, $P < 0.05$).

Conclusions TRS plays a 'dynamic' role in strengthening the positive impact of high pharmacist collaboration on prescribing rather than a 'supportive' role in increasing physicians' readiness to gather information and recommendations from the pharmacist.

Keywords: pharmacist expert; collaboration; trustworthiness; prescribing

Introduction

Trustworthiness (TRS) is suggested as the primary driver that can improve and support the physician–pharmacist relationship,[1, 2] which positively influences prescribing.[3–5] A growing number of empirical studies have identified TRS as pertinent to achieving functional relationships and future collaborations between healthcare professionals (physicians and pharmacists).[1, 2, 6] Despite its importance, few studies have examined TRS as an antecedent of pharmacist collaboration and subsequent trust-related actions,[7–10] such as physician prescribing behaviour.[2, 6, 11] Other studies have neglected to incorporate a mechanism of TRS to moderate the weak link between pharmacist–physician collaboration (PPC) and improving drug prescribing.[2, 3, 11] Some of the studies in the literature related to cooperation, TRS and prescribing are summarized in Table 1.

According to Rubio-valera *et al.*[12] there is an apparent empirical ambiguity regarding physician prescribing responses to pharmacist collaboration influence. Moreover, pharmacist collaboration and prescribing behaviour literature are fragmented, while the lack of studies on pharmacist expertise is evident.[13] This gap is shocking considering that cooperation depends on the evaluation of TRS

between physicians and pharmacists and is crucial to building such a relationship. Literature supports the logic that TRS moderates the link between collaboration, pharmacist expertise and the prescribing decision. However, the rationale for such moderating results has not been addressed, either conceptually or empirically, which further justifies the need for this research.

Nonetheless, the role of TRS among physicians and pharmacists has evolved into regular practice in different parts of North America, Europe and Australia as a robust approach to developing any collaborative relationship between physician and pharmacist (see Table 2). In addition, the healthcare systems of these countries provide much-needed funding for collaboration among healthcare providers. However, there remains the need for a holistic approach to entrench TRS among physicians and pharmacists in developing countries. Although healthcare systems in developing countries are reviewing regulations, removing barriers and facilitating TRS among healthcare professionals, the progress to date is not encouraging, hence the need for this study to re-emphasize the need and proffer multifaceted pragmatic solutions.

This study examines the moderating role of TRS on the relationship between pharmacist expertise, PPC and physician decision to prescribe drugs. We hypothesized that the relationship between pharmacist expertise, PPC and the physician's prescribing decision (PPD) would be stronger in the case of a high level of TRS (Figure 1).

Hypotheses development

Akter *et al.*[15] revealed the impact of moderating TRS on behavioural intentions or the decision-making process in a healthcare setting. In contrast, Hager *et al.*[14] posited that a physician's perception of pharmacist expertise and pharmacist collaboration is robust in a high level of TRS on the part of the physicians. Hence, when a pharmacist establishes TRS, physicians can receive reliable drug-related information without perusing many references and are guaranteed open discussions and positive pharmacy experience regarding the prescribed drugs. Similarly, TRS is a critical issue regarding increasing a physician's readiness to gather information and recommendations from the pharmacist,[9–14] leading to a higher perception of the pharmacists' expertise by physicians, as opposed to situations

Table 1 Summary of research studies of collaboration, TRS and prescribing

Author	Industry/country	Topic	Results
McDonough and Doucette[7]	Pharmacists/USA	Collaborative care between pharmacists and physicians	The factor influencing the development of pharmacist–physician collaborative care was TRS
Zillich *et al.*[8]	Physicians /Australia	Develop and validate the collaboration instrument for physicians	TRS emerged as the domain of PPC
Liu *et al.*[9]	Pharmacists/USA	The development of PPC over 3 months	TRS might have a continuous influence on the collaborative relationship between physician and pharmacist
Snyder[10]	Pharmacists/USA	Exploring successful community pharmacist–physician collaborative care	Community pharmacists and physicians engaged in highly collaborative relationships view TRS
Kucukarslan *et al.*[11]	Physicians/USA	Physician beliefs and attitudes towards collaboration with community pharmacists	Physicians (pulmonologists) rated their relationship with their community pharmacists higher on the TRS. TRS acts as the antecedent of pharmacist collaboration and subsequent trust-related actions, such as physician prescribing behaviour

Table 2 The roles of TRS among physicians and pharmacists in previous research

Dimensions/components	Mechanisms	Descriptions
Framing communication[10]	Open communication	Elaborates bi-directional communication.
	Bridging	Narrows the gap between physician and pharmacist.
	Stimulating	Stimulates interaction between pharmacists and physicians.
	Integrating	Integrates pharmacists and physicians into engaged in collaborative relationships.
	Informing	Makes first-hand information and develops an intimate partnership.
Developing trust[7–9]	Mutual trust	Understands the expertise and skills of the other party.
	Builds confidence	Instils confidence of physician to trust a pharmacist's word and expertise.
	Respect for each other	Develops a trustworthy relationship.
	Positive	Imparts strong positive collaborative.
Building commitment[5, 8, 11, 14]	Encouraging	Encourages collaborative working.
	Team building	Works together at different times.
	Improving	Improves collaborative relationships continuously.
	Prescribing orientation	Improves prescribing drugs.
	Consistency	Commits to interacting with that pharmacist in the future.

where the level of TRS is low. Therefore, this research hypothesizes that pharmacist expertise will be more important for physicians with a high level of TRS regarding the recommendations and information. Hypothesis 1 (H1) is explicitly presented below:

H1: The relationship between pharmacist expert power and physician decision to prescribe drugs is moderated by TRS, such that the higher the TRS, the stronger the positive effect.

Although pharmacist collaboration is theoretically crucial to improving prescribing, little work has been done on the role of pharmacist collaboration in drug prescribing decisions, such as the work by Kucukarslan *et al*.[11]Therefore, there remains the need for a study that would focus on understanding the relationship between pharmacist cooperation and PPD, which may help the delivery of effective primary health care.[1, 12] To explain the increasingly complex phenomenon of cooperation, several researchers have emphasized that TRS is the most important incentive to the pharmacist–physician cooperation, and making collaboration of a pharmacist more visible to a physician, in turn, improves prescribing behaviour.[16–18] Therefore, apart from the level of communication as a complement to the pharmacist–physician cooperation, TRS is essential to initiating, operating, developing and facilitating collaborations between pharmacists and physicians regarding drug prescribing.[3, 7, 10, 19] Thus, as TRS in physicians increases, the more intense the collaboration between physicians and pharmacists when prescribing drugs. Therefore, it is argued that the level of cooperation will be more visible for physicians with a higher level of TRS. Thus, it can be hypothesized that:

H2: The relationship between the PPC and physician decision to prescribe drugs is moderated by TRS, such that the higher the TRS, the stronger the positive effect.

Methods

Survey research questionnaire

This study has adopted a cross-sectional quantitative research approach that uses a structured questionnaire for data collection as the primary research instrument. This study adapted four items from Tahaineh *et al*.[20] to measure pharmacist expertise. Four measurement items for collaboration and TRS were adapted from Liu *et al*.[9] and Hager *et al*.[14] Physician decision to prescribe the drug was measured using the three items adapted from Hartono *et al*.[21] cited by Murshid and Mohaidin.[22]

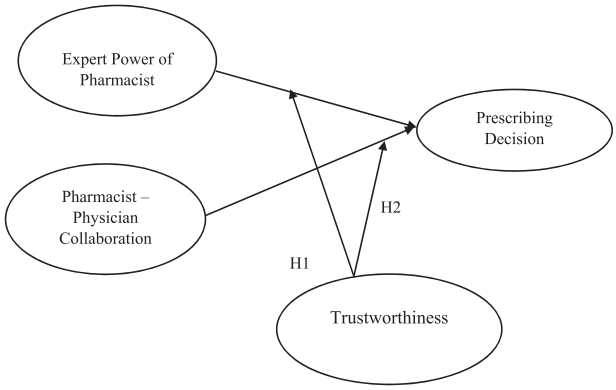

Figure 1 The theoretical model and research hypotheses.

The previous version of this questionnaire was first developed in English and later translated to the Arabic language via back-translation by three experts who ensured the clarity and accuracy of the translated items. In addition, the opinions of experts (four physicians and three academics in pharmacy and health care) were obtained to ensure the content validity of the questionnaire. Finally, the experts were asked to judge the appropriateness of items chosen to measure the construct presented. Though experts modified all the variables, the pilot study was conducted to pre-test the questionnaire and pattern of the statements. Fifty questionnaires were administered, but 30 were returned and validated for the pilot study analysis. Next, the reliability of the measurement instruments was assessed via Cronbach's alpha. The values for pharmacist expertise, pharmacist collaboration, pharmacist TRS and prescribing decision were 0.930, 0.817, 0.817 and 0.754, which indicates that the instruments are highly reliable.

Population and setting

This study population comprises physicians working in private and public hospitals in Sana'a City, Yemen. These physicians were either general practitioners (GPs) or specialists to generalize findings across all physicians and obtain perspectives from both sides. The selection of Sana'a City as this study area is due to various physicians' populations, with multiple specializations and years of experience, across a broad geographic location in the city, which is in line with previous studies. Therefore, this study's sampling frame comprises 1732 physicians, comprising GPs and specialists in Sana'a City, Yemen. The Cochran formula was initially utilized to decide on the optimum sample size, and a value of 470 was obtained. However, given the risks of inadequate responses and insufficient data for analysis because of extreme variability in physician response rates, the sample size was increased by 50% to attain 705.

Ethics approval

This study is non-interventional and does not involve patients. Hence, no ethical approval was needed. Nonetheless, an undertaking according to the moral standards and procedures set for this type of research in Yemen and the academic institutions was involved. The Ministry of Public Health and population (MoPHP) reviewed the questionnaire to ensure that it was in line with the National Statement on Ethical Conduct. An official letter introducing the researcher and explaining the purpose of this study was collected from MoPHP, which assisted the researcher in getting the support of the hospitals and respondents (with reference D/B/116; 26 April 2017).

Data collection

Data were collected from the physicians operating in outpatient clinics in public and private hospitals, who were authorized to prescribe. These physicians were purposively selected because they are believed to influence drug prescription in hospitals. This research excluded those who were unauthorized to prescribe, such as radiologists, microbiologists, anaesthesiologists, haematologists and those in nuclear and forensic medicine.

The drop-off/pick-up method was used to administer the questionnaires to the respondents. This method helps respondents to complete the questionnaire at their own time and convenience. Seven hundred and five questionnaires were distributed, and 420 responses were received, generating a response rate of 59.5%. After removing the wrongly filled cases, a total of 393 usable responses were available for data analysis.

Table 3 Demographic variables

Demographic variable		Number of respondents (N = 393)	Valid percentage (%)
Gender	Male	281	71.1
	Female	112	28.9
Number of patients seen daily	1–15 patients/day	168	42.8
	16–30 patients/day	160	40.7
	>30 patients/day	65	16.5
Years of experience in practice	Less than 5 years	165	42
	Between 5 and 10 years	228	58

Table 4 Means (M), standard deviation (SD) and correlation

No.		M	SD	1	2	3	4
1	PPC	3.757	.860	1			
2	PEP	3.780	.845	.556**	1		
3	TRS	3.601	.945	.449**	.254**	1	
4	PPD	3.843	.908	.440**	.201**	.297**	1

**Significant at $P < 0.01$.

The non-response bias was checked using the Armstrong and Overton[23] method of comparing the responses of late respondents (102 late respondents) with those of early respondents (291 early respondents within 30 days) on main variables and reactions on the principal constructs. The independent samples *t*-test showed that the equal variance significance values for all the variables were >0.05 significance level of Levene's test for equal variances.[24] Table 2 indicates the respondents' demographics (Table 3), while Table 4 presents means (M), standard deviation (SD) and correlation.

Statistical analysis

Structural equation modelling (SEM) was employed using Smart Partial Least Squares software (PLS 3.0) to examine the hypothesized moderating effects of selected variables. Compared with LISREL and AMOS, PLS-SEM is the most efficient way to deal with the moderators.[25] The proposed research model was tested in two stages. The first stage involves assessing the outer measurement model, followed by an examination of the structural model.[26]

Results

Measurement model

As illustrated in Table 5, the convergent validity of the model is confirmed by the high factor loadings, which surpass the minimum required values (higher than 0.708) for all items,[27] except one item from the construct of pharmacist collaboration with physician (PCP) outer loadings that falls below 0.708 and thus deleted. The average variance extracted (AVE) values for all exhibited loadings are higher than 0.50 on their respective constructs, indicating adequate convergent validity.[28] Furthermore, Cronbach's alpha and composite reliability values for all the constructs fall within reasonable ranges of 0.770–0.800 and 0.860–0.868, respectively, which corroborates the construct reliability of the model (>0.70). Also, the discriminant validity was confirmed based on computing the AVE of each construct. As presented in Table 6, the square root of the AVE exceeded the correlations among latent constructs, suggesting adequate discriminant validity.[29]

Structural model

After assessing the measurement model, the analysis then moved to the evaluation of the structural model. Before evaluating the structural model, the model fit was assessed. The variance inflation factor values were found to be less than the standard criteria reported by Hair *et al.*,[26] i.e. <3.3, which indicates the absence of multicollinearity. The R^2 for the prediction of prescribing decisions was 0.224. Finally, the Stone–Geisser's Q2 statistic(s) was 0.248, which is considerably higher than zero (0), suggesting that it is slightly relevant for the sizeable prediction of the endogenous construct (i.e. a prescribing decision).

Hypotheses testing

The bootstrap procedure with 1000 (one-tallied, 0.5) bootstrap re-sampling was implemented to assess the hypothesized moderating variable. The hypothesized moderating variable was examined using the orthogonalization method recommended by Henseler and Fassott.[30] First, the two interaction terms between pharmacist expert power (PEP), PPC, and TRS were created. These orthogonality terms were then used as indicators of the interaction in the structural moderating model of TRS (see Figure 2 and Table 7). Contrary to our prediction, the findings in Table 6 show that the interaction effect between PEP and TRS in predicting the decision of physicians to prescribe the drugs was not statistically significant ($\beta = 0.054$, $t = 0.483$, $P > 0.10$, $f^2 = 0.003$). Thus, H1 is not supported. In support of H2, the results showed a significant positive interaction effect between pharmacist–physician cooperation and TRS in predicting the decision of physicians to prescribe drugs ($\beta = 0.137$, $t = 1.653$, $P < 0.05$, $f^2 = 0.183$), hence providing strong support for H2. The effect size f^2 of this interaction was = 0.183, which is considered small. However, a small f^2 does not necessarily signify an unimportant effect. The interaction effect's inclusion shows when the two interaction effects are inputted in the model, as R^2 increased to 0.268 (Figure 3), resulting in an R^2 change of 4.4 % (Table 6), which confirms the moderating effect of TRS.

Additional analysis

To further elaborate the moderating phenomenon of TRS, the interaction effect was plotted on a graph (Figure 4) to see how the moderator (TRS) changes the relationship between PPC and PPD. The plot in Figure 4 shows a positive relationship between PPC and the PPD. Furthermore, the rate of change was higher for the high TRS group than the low TRS group. In other words, high TRS provides a more profound effect on the relationship between PPC and PPD. Thus, high TRS strengthens the positive relationship between pharmacist cooperation and prescribing decisions instead of situations where the level of trust is low.

Discussion

This study found that TRS has a significant moderating effect on the relationship between pharmacist collaboration and prescribing decision, but not on the pharmacist expertise – prescribing decision relationship. These findings suggest that TRS plays a "dynamic" role in

Table 5 Summary of measurement model results

		Convergent validity		Internal consistency reliability	
		Loadings	AVE	Cronbach's reliability	Composite alpha
Latent variable	Items	(>0.708)	(>0.50)	(>0.70 <0.95)	(>0.70 <0.95)
Pharmacist expert power	PEP1	0.761	0.606	0.783	0.860
	PEP2	0.795			
	PEP3	0.829			
	PEP4	0.725			
Pharmacist–physician collaboration	PPC1	0.854	0.676	0.759	0.861
	PPC3	0.892			
	PPC4	0.710			
Physician prescribing decision	PPD1	0.847	0.686	0.770	0.868
	PPD2	0.861			
	PPD3	0.776			
TRS	TRS1	0.821	0.624	0.800	0.868
	TRS2	0.849			
	TRS3	0.718			
	TRS4	0.763			

Source: SmartPLS 3.0 (Algorithm 300).

Table 6 Discriminant validity of construct – Fornell-Larcker criterion

		1	2	3	4
1	PEP	**0.779**			
2	PPC	0.530	**0.822**		
3	PPD	0.203	0.471	**0.829**	
4	TRS	0.264	0.431	0.303	**0.790**

Bold text represents the value square root of AVE.

strengthening the positive impact of high pharmacist collaboration on prescribing, rather than a "supportive" role in increasing physicians' readiness to gather information and recommendations from the pharmacist. One plausible explanation is that physician prescription decisions are more influenced by a pharmacist's knowledge than trust in pharmacist expertise in case of the interaction effect[4]; therefore, the moderating power of TRS as a theory is less pronounced.

As this research measured pharmacist expertise primarily based on experience, information and suggestions, there might be the possibility that physicians who highly trust their pharmacist prefer getting advanced and comprehensive information on drugs. Their preferences may lead them to perceive the expertise based on experience as unfavourable. Without trust in the professional skills and ethical character of the pharmacist, true collaboration is not possible.[31] At this stage, the physician would not need to doubt the drug-related information provided by the pharmacist, which can improve their prescribing behaviour.

In practice, physicians may be interested in collaborating with pharmacists when they perceived them as trustworthy. As shown in Figure 4, the tendency of pharmacist collaboration to positively influence prescribing behaviour is more likely to happen under the condition of a high level of TRS. This finding aligns with previous studies,[9, 14] where physicians were more interested in collaborating with highly trusted pharmacists. Thus, TRS is critical to promoting and supporting the collaborative working relationship between physicians and pharmacists. It would be possible for TRS to improve collaborations between physicians and pharmacists and make the level of cooperation of a pharmacist more visible to the physician, as revealed in these findings.

This finding can also be explained by social power theories, which posit that the strength of collaboration depends on TRS. Wherever collaboration influence occurs, it seems to be necessary for "P (physician) to think *that O (pharmacist) knows and for P to trust that O is telling the truth.*"[32] In the case of high reliability (TRS), the cooperation of the pharmacist will be more visible to a physician than that of an unreliable pharmacist. In physician–pharmacist relationship literature, the positive association between collaboration and improving prescribing behaviours confirms that proximity leads to familiarity, which appears to be associated with approachability and trust.[33, 34]

Impacts on practice

Government and policymakers should consider the importance and impact of TRS when drawing up policies and procedures to enhance cooperation between physicians and pharmacists to improve physicians' prescribing behaviour starting from the formation stage of the alliance. Policymakers that are serious about the relationship between physicians and pharmacists can, with some confidence, work out how to build and strengthen TRS between them, which will reduce the irrational prescription of drugs. Although health policymakers do their best to ensure TRS between physicians and pharmacists in practice", unfortunately, minimal collaboration occurs in the practice setting, hence the need to address the level of trust, two-way communication, and commitment issues.

Strengths and weaknesses

The existing literature on the pharmacist–physician relationship has revealed a lack of empirical knowledge on how the interaction between TRS and different interactions such as PEP and pharmacist collaboration can shape prescribing behaviour. Previous studies identified TRS as pertinent to achieving active PPC, although they failed to link the moderating effect of TRS to drug prescribing decisions. This research provides additional analysis within the PLS framework using a new approach (orthogonalizing) to test the moderating effect of TRS. This endeavour of using PLS-SEM is a novel approach to the assessment of the moderating impact of TRS.

The weakness of this study mainly involves the design of the purposive sampling to elicit responses from physicians that are

Table 7 Results of the hypothesis testing on the moderating effect of TRS

Size effect	f^2	Supported	T-value	Std. error	Std. beta	Variables	H
					−0.093**	PEP * PPD	
					0.464**	PPC * PPD	Main effect
			2.163		0.128***	TRS * PPD	
—	0.003	No	0.483	0.095	0.054	PEP * TRS	H1
Small	0.183	Yes	1.653	0.065	0.137**	PPC * TRS	H2
					0.224	R^2	Interaction effect
					0.268	R^2 change	

Source: SmartPLS 3.0.
***Significant at $P < 0.01$; **significant at $P < 0.05$; (one-tailed); bootstrapping (1000, $N = 393$).

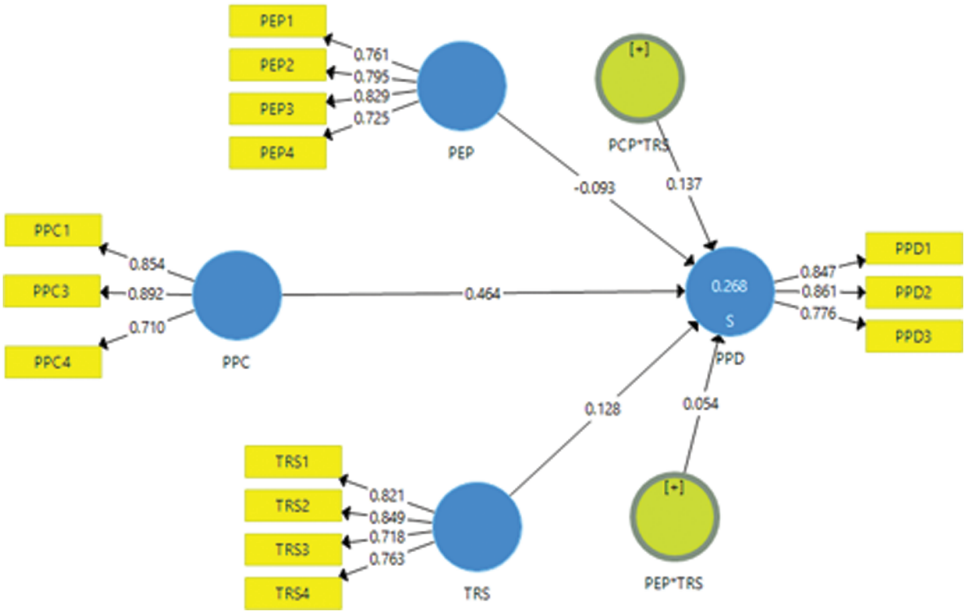

Figure 2 Summary of the measurement model.

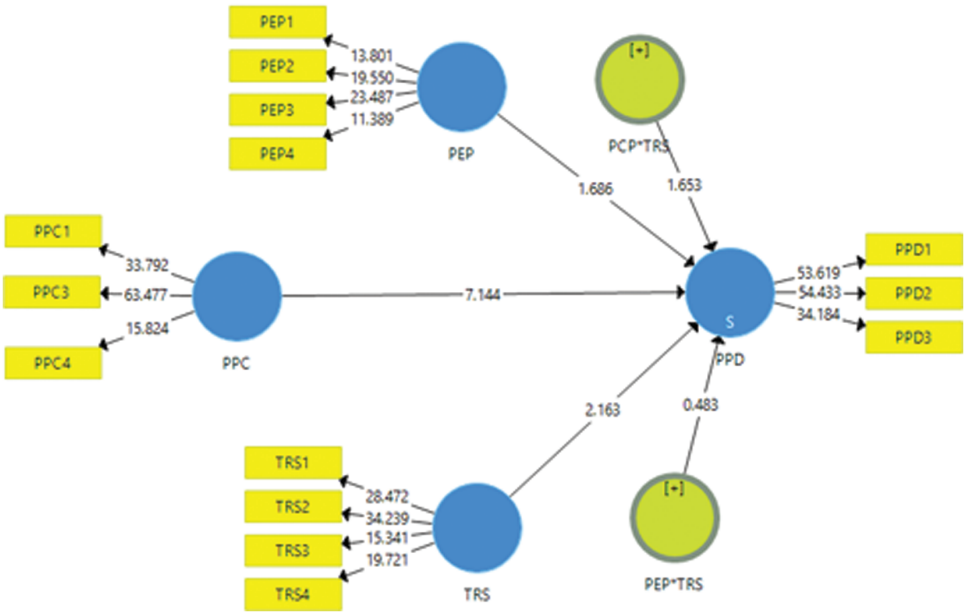

Figure 3 Summary of the structural model.

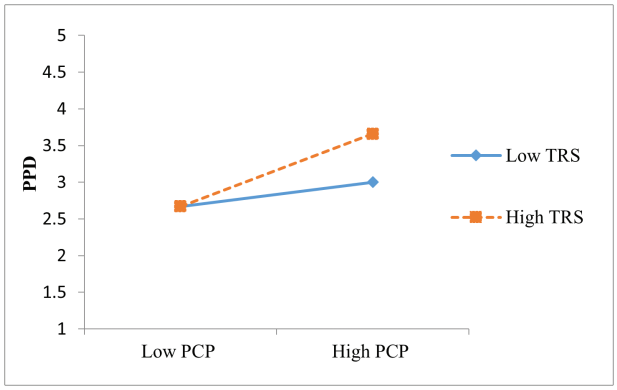

Figure 4 Interaction effect of PCP and TRS on PPD.

knowledgeable in the area of drug prescribing. This is not necessarily a study's weakness as long as attempts to generalize the findings are not made. Although the physicians were recruited from different specializations, certain specialists or physicians did not participate in the survey. Another weakness or limitation is that pharmacist–physician TRS may vary for the other classes of pharmacists, i.e. clinical and community, and across healthcare facilities. Therefore, future research can examine the type of pharmacists or instead use community pharmacists as a proxy. Furthermore, this study uses a self-report questionnaire to collect data that is often associated with social desirability bias. Although this study attempted to reduce this problem by ensuring anonymity and improving the scale items, participants in this study may agree more on socially desirable answers rather than honestly expressing the collaborative relationship between pharmacist and physician regarding prescribing decisions on survey questionnaires. Therefore, in the future, it will be important for researchers of future studies to combine quantitative and qualitative methods to conduct an in-depth investigation of this relationship.

Conclusions

This study explored that TRS moderates the link between collaboration and the prescribing decision. The rationale for such moderating results had not been addressed, either conceptually or empirically; therefore, it justified the need for this research. The results showed a significant positive interaction effect between pharmacist–physician cooperation and TRS in predicting PPD. Moreover, high levels of TRS provide a more profound impact on the relationship between PPC and PPD instead of situations where the level of trust is low. Therefore, the findings provide an initial indication of the advantage of the dynamic role of TRS between physicians and pharmacists to strengthen cooperation. The resultant effect would be prescribing behaviour will be improved and increase the inter-professional link, as teamwork should aim for better health care.

Author Contributions

MAM participated in study design, data collection, conducting all analytical testing, interpretation of results, preparation of the manuscript draft, and reviewing the manuscript. ZM participated in the study design and discussed the analyzes and results while MZ and MA reviewed the manuscript.

Funding

This study received no specific grant from any funding agency in public, commercial or not-for-profit sectors.

Conflict of Interest

The authors declare that they have no conflicts of interest to disclose.

References

1. Liu Y, Doucette WR. Exploring stages of pharmacist-physician collaboration using the model of collaborative working relationship. *J Am Pharm Assoc (2003)* 2011; 51: 412–7. http://doi.org/10.1331/JAPhA.2011.10068
2. Shakeel S, Iffat W, Fasih F *et al*. Pharmaceutical care and health systems expanding role of pharmacists in delivering clinical services ; general practitioners ' and pharmacists ' viewpoint. *Pharm Care Health Syst* 2015; 5: 2–6. http://doi.org/10.4172/2376-0419.1000148
3. Dey RM, de Vries MJ, Bosnic-Anticevich S. Collaboration in chronic care: unpacking the relationship of pharmacists and general medical practitioners in primary care. *Int J Pharm Pract* 2011; 19: 21–9. http://doi.org/10.1111/j.2042-7174.2010.00070.x
4. Bradley F, Ashcroft DM, Noyce PR. Integration and differentiation: a conceptual model of general practitioner and community pharmacist collaboration. *Res Social Adm Pharm* 2012; 8: 36–46. http://doi.org/10.1016/j.sapharm.2010.12.005
5. Bardet J, Vo T, Bedouch P *et al*. Physicians and community pharmacists collaboration in primary care: a review of specific models. *Res Social Adm Pharm* 2015; 33: 1–21. http://doi.org/10.1016/j.sapharm.2014.12.003
6. Doucette WR, Nevins J, McDonough RP. Factors affecting collaborative care between pharmacists and physicians. *Res Social Adm Pharm* 2005; 1: 565–78. http://doi.org/10.1016/j.sapharm.2005.09.005
7. McDonough R, Doucette W. Dynamics of pharmaceutical care: developing collaborative working relationships between pharmacists and physicians. *J Am Pharm Assoc* 2001; 41: 682–92.
8. Zillich A, McDonough RP, Carter BL *et al*. Development and initial validation of an instrument to measure physician-pharmacist collaboration from the physician perspective. *Value Health* 2005; 8: 10–14. http://doi.org/10.1111/j.1524-4733.2005.03093.x
9. Liu Y, Doucette WR, Farris KB. Examining the development of pharmacist-physician collaboration over 3 months. *Res Social Adm Pharm* 2010; 6: 324–33. http://doi.org/10.1016/j.sapharm.2009.11.002
10. Snyder ME, Zillich AJ, Primack BA *et al*. Exploring successful community pharmacist-physician collaborative working relationships using mixed methods. *Res Social Adm Pharm* 2010; 6: 307–23. http://doi.org/10.1016/j.sapharm.2009.11.008
11. Kucukarslan S, Lai S, Dong Y *et al*. Physician beliefs and attitudes toward collaboration with community pharmacists. *Res Social Adm Pharm* 2011; 7: 224–32. http://doi.org/10.1016/j.sapharm.2010.07.003
12. Rubio-Valera M, Jové AM, Hughes CM *et al* Factors affecting collaboration between general practitioners and community pharmacists: a qualitative study. *BMC Health Serv Res* 2012; 12: 188–95. https://doi.org/10.1186/1472-6963-12-188
13. McKinnon, A, Jorgenson, D. Pharmacist and physician collaborative prescribing: for medication renewals within a primary health centre. *Can Fam Physician* 2014; 55: 12.
14. Hager KD, Uden D, Fccp P *et al*. Bridging the location gap : physician perspectives of physician-pharmacist collaboration in patient care (BRIDGE Phase II). *J Res Interprof Pract Educ* 2015; 5: 1–14. http://doi.org/10.22230/jripe.2015v5n2a199
15. Akter, S, Ambra J, Ray P. Trustworthiness in health information services: an assessment of a hierarchical model with mediating and moderating effects using partial least squares (PLS). *J Am Soc Inf Sci Technol* 2011; 62, 100–16. http://doi.org/10.1002/asi.21442
16. Zwarenstein M, Goldman J, Reeves S. Interprofessional collaboration : effects of practice-based interventions on professional practice and healthcare outcomes. *Cochrane Database Syst Rev* 2009; 3. http://doi.org/10.1002/14651858.CD000072.pub2
17. Rayes I, Abduelkarem A. A qualitative study exploring physicians' perceptions on the role of community pharmacists in Dubai. *Pharmacy Pract (Granada)* 2016; 14: 738. http://doi.org/10.1002/asi.21442
18. Muijrers PE, Grol RP, Sijbrandij J *et al*. Differences in prescribing between GPs: impact of the cooperation with pharmacists and impact of visits from

pharmaceutical industry representatives. *Fam Pract* 2005; 22: 624–30. http://doi.org/10.1093/fampra/cmi074

19. Ion L. Qualitative study on physicians' motivations and drug prescribing behavior. Working paper, Vol. 1. Iași, Romania: Centre for European Studies (CES), Alexandru Ioan Cuza University, 2013, 21–32.
20. Tahaineh LM, Wazaify M, Albsoul-Younes A *et al*. Perceptions, experiences, and expectations of physicians in hospital settings in Jordan regarding the role of the pharmacist. *Res Social Adm Pharm* 2009; 5: 63–70. http://doi.org/10.1016/j.sapharm.2008.05.003
21. Hartono S, Sumarwan U, Suharjo B *et al*. Model of physician decision-making process on prescribing prescription drug in Indonesia. *Int J Inform Technol Business Manage* 2014; 1: 1–10.
22. Murshid MA, Mohaidin Z. The influence of information, brand, medical representatives, and sales promotion on physician prescribing decision. *J Pharm Health Serv Res* 2018; 3: 259–69. https://doi.org/10.1111/jphs.12228
23. Armstrong JS, Overton TS. Estimating nonresponse bias in mail surveys. *J Mark Res* 1977; 3: 396–402. http://doi.org/10.2307/3150783
24. Pallant J. *SPSS Survival Manual*. New York: McGraw-Hill Education, 2011.
25. Fassott G, Henseler J, Coelho PS. Testing moderating effects in PLS path models with composite variables. *Ind Manag Data Syst* 2016; 116: 1887–900. https://doi.org/10.1108/IMDS-06-2016-0248
26. Hair JF, Hult G, Tomas M *et al*. *A Primer on Partial Least Squares Structural Equation Modeling (Pls-Sem)*. 2nd ed. Thousand Oaks: Sage, 2017.
27. Avkiran NK. An in-depth discussion and illustration of partial least squares structural equation modeling in health care. *Health Care Manag Sci* 2017; 1–8. http://doi.org/10.1007/s10729-017-9393-7
28. Hair JF, Sarstedt M, Hopkins L *et al*. Partial least squares structural equation modeling (PLS-SEM): an emerging tool in business research. *Eur Bus Rev* 2014; 2: 106–21. http://doi.org/10.1108/EBR-10-2013-0128
29. Fornell C, Larcker DF. Evaluating structural equation models with unobservable variables and measurement error. *J Mark Res* 1981; 1: 39–50. http://doi.org/10.1177/002224378101800104
30. Henseler J, Fassott G. Testing moderating effects in pls path models: an illustration of available procedures. In: Vinzi V. E., Chin W. W., Henseler J., & Wang H. (eds.), *Handbook of Partial Least Squares: Concepts, Methods and Applications*. Berlin: Springer, 2010, 713–35.
31. Gregory, Austin Z. Trust in interprofessional collaboration: perspectives of pharmacists and physicians. *Can Pharm J* 2016; 4: 236–45. http://doi.org/10.1177/1715163516647749
32. French, JR, Raven B. *The bases of social power*. In: Cartwright D. (ed.), *Studies in Social Power*. Ann Arbor, MI Raven, B: University of Michigan Press, 1959, 150–67.
33. Murshid MA, Mohaidin Z. Models and theories of prescribing decisions: a review and suggested a new model. *Pharm Pract (Granada)* 2017; 15: 990. http://doi.org/10.18549/PharmPract.2017.02.990
34. Curran GM, Freeman PR, Martin BC *et al*. Communication between pharmacists and primary care physicians in the midst of a U.S. opioid crisis. *Res Social Adm Pharm* 2019; 15: 974–85. http://doi.org/10.1016/j.sapharm.2018.08.006