

Role of Public Relations and Direct Marketing in Shaping Prescribing Behavior of Physicians

Madeeha Irshad ^{1*} Asghar Iqbal ² Kanwal Iftikhar ³

¹ Assistant Professor, Department of Management Sciences, COMSATS University Islamabad, Pakistan.

Email: madeeha.irshad@comsats.edu.pk

² MBA Scholar, Department of Management Sciences, COMSATS University Islamabad, Abbottabad Campus, Khyber Pakhtunkhwa, Pakistan. Email: asghariqbal123@gmail.com

³ MBA Scholar, Department of Management Sciences, COMSATS University Islamabad, Abbottabad Campus, Khyber Pakhtunkhwa, Pakistan. Email: kanwalmalik8077@gmail.com

ABSTRACT: The prescribing behavior of physicians is one of the critical aspects in pharmaceutical industry that influence the use of pharmaceutical or healthcare products. The prescription behavior of physicians is influenced by a number of factors. The present study aims to identify the role of public relations and directing marketing in terms of affecting physicians' attitude and their prescribing behavior. The study employed a cross-sectional approach to collect data from physicians in Pakistan using simple random sampling technique. SPSS and SMART PLS were utilized to analyze the data. The results showed that public relations had a significant impact on physicians' attitude and prescribing behavior. On the other hand, direct marketing had an insignificant impact on physicians' attitude and prescribing behavior. The study has important implications for both theory and practice.

Pages: 330 – 339

Volume: 5

Issue: 7 (July 2026)

Corresponding Author

Madeeha Irshad

✉ madeeha.irshad@comsats.edu.pk

Cite this Article: Irshad, M., Iqbal, A., & Iftikhar, K. (2026). Role of Public Relations and Direct Marketing in Shaping Prescribing Behavior of Physicians. *The Regional Tribune*, 5(7), 330-339.

<https://doi.org/10.55737/trt/v-vii.414>

KEYWORDS: Public Relations, Direct Marketing, Attitude, Prescribing Behavior

Introduction

Pharmaceutical marketing occupies a unique space in marketing and consists of an ecosystem that is comprised of physicians, patients, regulators, and insurers. It is defined as strategic activities pharmaceutical companies undertake to promote their products to healthcare professionals, patients, and regulatory bodies (Levy, 1994). As pharmaceutical companies compete in a highly competitive and saturated market (Dialectia, 2025; Piachaud, 2004), pharmaceutical marketing has evolved from a general commercial activity into a long-term and strategic mandate based on healthcare budgets, patients' expectations, and physicians' behavior. Pharmaceutical companies integrate various marketing techniques such as advertising, personal selling, sales promotion, direct marketing, and public relations in their promotional strategies. According to the WHO (1988), pharmaceutical promotion encompasses all informational and persuasive efforts by manufacturers and distributors aimed at encouraging the prescription, distribution, purchase, and utilization of medicinal drugs. Pharmaceutical companies aim to educate physicians about their drugs, convince them to prescribe their products, and continuously reinforce awareness of their brands throughout the drug's lifecycle to sustain its market presence and brand value.

Promotion of pharmaceutical products plays a crucial role in driving prescriptions and sales. Within this framework, medical sales representatives (MSRs) serve as vital intermediaries, facilitating communication between physicians and the pharmaceutical industry, and actively promoting their products. Pharmaceutical companies convince doctors about their brands. They convince physicians to prescribe their brands and keep reminding

physicians about their brands throughout the brand life cycle to keep up with the brand's equity (Spiller & Wymer, 2001). A physician is a key figure who chooses a suitable pharmaceutical brand appropriate for the specific state of the patient; subsequently, the main focus of pharmaceutical companies is to control the prescribing behavior of doctors (Shakeel et al., 2019). The contribution of the pharmaceutical sector in Pakistan is more than one percent of the GDP. Revenue in the drug market in Pakistan is projected to reach US\$2,482 million in 2023. Revenue is expected to exhibit an annual growth rate of 1.59%, resulting in a market size of US\$2,686 million by the year 2028 (Statista, 2023). In 2022, the pharmaceutical sector in the United States of America spent nearly US \$17.4 billion on promotions. According to Statista (2023), in 2021, the promotional expenditure in the industry amounted to US\$16.8 billion. Schlender et al. (2021) evaluate that in 2019, the average cost of research and development will range from US\$161 million to US\$4.54 billion. Nations in Latin America, Asia-Pacific, Africa, and the Middle East are supposed to develop over 10% by volume over the five years to 2027 (IQVIA, 2023). In 2022, around US\$1.48 trillion was spent on drugs, up from only US\$887 billion in 2010. That number is supposed to increase to over US\$1.9 trillion by 2027 (Statista, 2023).

Sharifnia et al. (2018) explained the primary influencers affecting physicians' medication prescribing practices, offering a comprehensive overview of prescription patterns in Iran. Their research highlights that physicians predominantly consider factors such as payment methods, patient-specific variables, and product attributes when making prescribing decisions. The standard of associations between physicians and pharmaceutical organizations can altogether influence the rational prescription to their patients. Evidence indicates that pharmaceutical promotion has an impact on physicians' prescribing behavior, purchasers' ways of behaving, the relationship between physician and patient, and medical care quality and expenses (Yimenu & Abiyu, 2021).

Pharmaceutical promotion consists of all activities that promote the use of different medications, including selling, their supply, purchase, and prescription (Mor et al., 2024). Although pharmaceutical promotional tools have gained significant attention in marketing, little is known about their impact on physicians' attitudes towards them and their prescribing behavior. This research focuses on two types of pharmaceutical promotional tools that consist of public relations and direct marketing to examine their impact on physicians' attitude and prescribing behavior.

Theoretical Background

The theory of reasoned action is one of the most popular, supported, and well-documented theories to explain human behavior. It was introduced by Fishbein and Ajzen (1975). According to this theory, individuals are goal-oriented in their behavior and make rational decisions, and there are different determinants that shape this behavior (Wang et al., 2024). Theory of Reasoned Action has been used in different studies covering various domains. In the field of pharmacy, a number of scholars have utilized this theory to explain physicians' behavior. Kluit et al. (2025) utilized this theory to explain CWIC (clinical work-integrated care) of healthcare professionals. According to their findings, attitude is an important and strongest determinant of providing CWIC by healthcare professionals.

Public Relations, Attitude and Prescribing Behavior

Marketers turn their attention to public relations to make long-term associations with consumers by promoting or safeguarding the organization's image or individual product (Kotler, 2002). New product launching ceremonies, sponsorship of conferences, continuing medical education programs, and organizing seminars for physicians are included in public relations. Negash and Adamu (2017) conducted a study aiming to investigate how pharmaceutical promotion strategies affect physicians' prescribing behavior and identify which promotional tools are most persuasive in influencing prescribing behavior. They discovered that public relations tactics are utilized for establishing a long-term strategic image, building credibility, and boosting the organization's visibility, thereby enhancing other marketing endeavors.

Shakeel et al. (2019) conducted a study in Karachi to evaluate the prescribers' approach to interaction with medical representatives for drug promotion. Their survey findings indicated that a significant portion of respondents recognized medical sales representatives (MSRs) as pivotal connectors between pharmaceutical firms and healthcare professionals. Their interactions are beneficial as medical sales representatives fulfill a crucial educational role. Their analysis revealed that approximately half (50%) of the physicians surveyed deemed sponsored trips for continuing medical education (CME) acceptable. Pharmaceutical companies encourage continuing medical education (CME) and allowances for teaching or speaking in such events. Additionally, pharmaceutical companies also sponsor symposia and seminars for physicians and institutions in order to encourage physician prescribing behavior. Eldrwish et al., (2022) examined the factors that predict the prescribing behavior of physicians. Their research indicated that public relations played a significant role in shaping physicians' prescribing practices. Notably, they observed that female physicians were particularly susceptible to the influence of public relations, leading to increased prescription behavior.

Therefore, based on evidence, the proposed hypotheses are:

H1a: Pharmaceutical public relations significantly impacts the attitude of physicians towards pharmaceutical promotional tools.

H1b: Pharmaceutical public relations significantly impacts the prescribing behavior of physicians.

Direct Marketing, Attitude and Prescribing Behavior

Direct marketing involves the distribution of flyers and other promotional materials typically distributed by individual sellers. Direct advertising incorporates the utilization of communication media whose impact on individual members of the audience is quantifiable. The two conventional instruments of direct advertising are direct mail and the telephone (Kotler, 2002). Other methods include emails, text marketing, and door marketing, etc. An investigation of the influence of direct-to-physician promotion on physicians' prescription behavior in Malaysia found that direct marketing influences physicians' prescription decision-making. When a pharmaceutical organization launches a new product in the market, their first aim is to introduce their product to physicians. Hence, pharmaceutical marketers focus on activities such as sending direct emails to physicians. A study conducted in Sudan found that physicians' attitudes towards direct marketing positively influenced their prescribing behavior. They observed a positive influence of attitude towards direct marketing of pharmaceutical products (Eldrwish et al., 2022). Therefore, based on evidence, the proposed hypotheses are:

H2a: Pharmaceutical direct marketing significantly impacts the attitude of physicians towards pharmaceutical promotional tools.

H2: Pharmaceutical direct marketing significantly impacts the prescribing behavior of physicians.

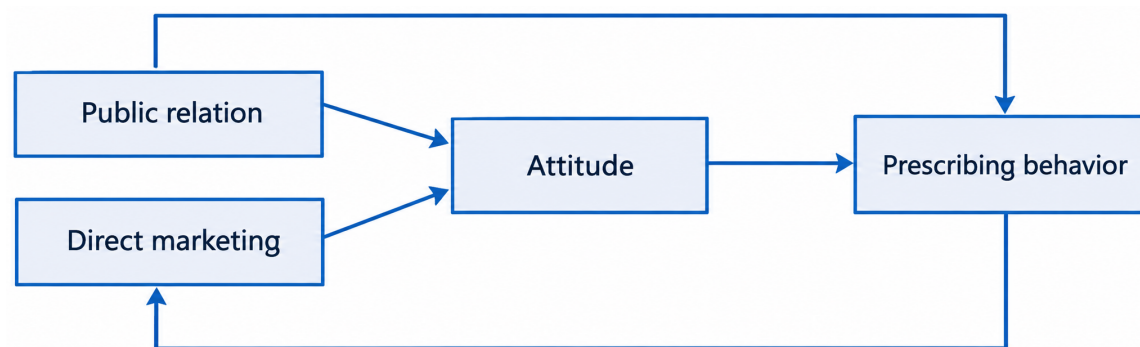
Attitude and Prescribing Behavior

Attitude is a favorable or unfavorable evaluation that shapes human behavior. Various studies have found a positive association of attitude with behavior. Chaihanchai and Anantachart (2023) found that attitude positively affects green purchasing behavior. Hazeena et al. (2023) found that attitude towards food safety is a strong predictor of food safety behavior. Pouratashi and Zamani (2022) also identified that attitude towards sustainable development is positively correlated with behavior towards sustainable development. As previous studies show that attitude is positively related with behavior in different contexts, therefore it is assumed that:

H3: Physicians' attitude significantly impacts the prescribing behavior of physicians.

Figure 1

Research model



Methodology

The present study is quantitative and cross-sectional in nature. A structured questionnaire was used to collect data from the respondents. The study comprised four variables whose items were adapted from previous studies. Public relations and direct marketing comprised five items that were adopted from Kabir and Maulan (2022). There were eight items that measured attitude and were adapted from Liu et al. (2019). Prescribing behavior was measured through five items adapted from Kabir and Maulan (2022). 5 point Likert scale was used to measure responses, which is one of the most commonly used scales in health and social sciences. The advantage of a five-point Likert scale is that it measures responses with enough variation, ranging from strongly disagree (1) to strongly agree (5).

Simple random sampling was employed to collect data from physicians of Abbottabad district in Pakistan. The district has physicians practicing in both public and private sector hospitals. For the purpose of the current research, a sample of 300 physicians was selected to collect responses.

Data Analysis

SPSS was used to analyze the demographic profile of the respondents and descriptive statistics. The results of the demographic profile show that most of the respondents, i.e., 61%, were in the age bracket of 35-45, and 42%. Most of them had a specialization in the field of medicine, i.e., 35%. The results of descriptive analysis are shown in Table 1. The results indicate that the values of skewness and kurtosis of all items were within the acceptable range of ± 2 (George & Mallery, 2010).

Table 1

Descriptive Analysis

		Mean	Std. Deviation	Skewness	Kurtosis
Public Relations	P.R1	3.53	.954	-.334	-.487
	P.R2	3.45	1.004	-.386	-.359
	P.R3	3.41	.998	-.323	-.212
	P.R4	3.38	.964	-.380	-.061
	P.R5	3.63	.949	-.476	-.200
Direct marketing	DRM1	3.04	1.126	.027	-.969
	DRM2	3.02	1.173	.092	-.960
	DRM3	2.98	1.147	.113	-.884
	DRM4	3.01	1.121	.123	-.879
	DRM5	3.09	1.101	.056	-.910

		Mean	Std. Deviation	Skewness	Kurtosis
Prescribing behavior	PRB1	3.46	.971	-.335	-.306
	PRB2	3.46	.991	-.236	-.400
	PRB3	3.53	.957	-.471	-.103
	PRB4	3.48	1.022	-.461	-.257
	PRB5	3.48	.951	-.631	.118
Attitude	AT1	3.44	.817	-.310	.130
	AT2	3.44	.845	-.150	-.001
	AT3	3.50	.855	-.263	-.158
	AT4	3.53	.885	-.260	-.150
	AT5	3.60	.800	-.295	.063
	AT6	3.53	.814	-.363	.117
	AT7	3.53	.810	-.413	.142
	AT8	3.52	.815	-.453	-.069

Table 2 shows the factor loadings of items. Factor loading measures how well an item expresses its underlying concept. The results show that the factor loadings of items ranged from 0.671 to 0.924. These values are within the acceptable range of 0.5 to 1 indicated by Hair et al. (2017).

Table 2

Factor loadings

	AT	DRM	PB	PR
AT1	0.792			
AT2	0.736			
AT3	0.707			
AT4	0.745			
AT5	0.736			
AT6	0.709			
AT7	0.677			
AT8	0.755			
DRM1		0.691		
DRM2		0.696		
DRM3		0.924		
DRM4		0.836		
DRM5		0.721		
PRB1			0.708	
PRB2			0.810	
PRB3			0.687	
PRB4			0.782	
PRB5			0.671	
P.R1				0.673
P.R2				0.772
P.R3				0.741
P.R4				0.751
P.R5				0.710

Table 3 shows the results of reliability and convergent validity. The results show that all variable had the Cronbach's alpha and composite reliability values of greater than 0.7. Cronbach's Alpha's and composite reliability value of 0.70 is considered adequate criteria respectively for variables (Bagozzi & Yi, 2012). The values of Cronbach's alpha ranged from 0.782 to 0.872. The values of composite reliability ranged from 0.852 to 0.900. All variable fulfilled the criterion of convergent validity as their values were above 0.5 which is above the recommended value of 0.5 (Bagozzi & Yi, 2012).

Table 3*Reliability and Convergent Validity*

Variables	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
Attitude	0.872	0.900	0.527
Direct Marketing	0.853	0.885	0.607
Prescribing Behavior	0.785	0.854	0.540
Public Relation	0.782	0.852	0.535

Table 4 shows the results of discriminant validity. The Fornell and Larcker(1981) criteria to identify discriminant validity were used. The results show that the square root of AVE of all constructs exceeded their correlation with other constructs.

Table 4*Discriminant Validity*

	Attitude	Direct marketing	Prescribing behavior	Public relations
Attitude	0.726			
Direct marketing	0.127	0.788		
Prescribing behavior	0.556	0.200	0.744	
Public relations	0.343	0.290	0.346	0.179

Table 5*Hypotheses Testing*

	Original sample	T statistics	P values
H1a Public Relation -> Attitude	0.618	9.056	0.000
H1b Public Relation -> Prescription Behavior	0.217	2.048	0.000
H2a Direct Marketing -> Attitude	0.060	0.682	0.495
H2b Direct Marketing -> Prescription Behavior	0.123	1.395	0.163
H3 Attitude -> Prescription Behavior	0.569	6.591	0.000

The analysis shows a significant positive relationship between public relations and attitude, with $\beta = 0.618$, $t = 9.056$, and $p < 0.05$. Therefore, H1a is accepted, indicating public relations significantly affect the attitude of physicians. The relationship between public relations and attitude is also statistically significant, with $\beta = 0.217$, $t = 2.048$, and $p < 0.05$. Consequently, H1b is also accepted. The relationship between direct marketing and attitude is not statistically significant, i.e. $\beta = 0.060$, with a t statistic of 0.682 and a p -value > 0.05 . Hence, H2a is rejected. This suggests that direct marketing, in this case, does not have a significant impact on attitude. Direct marketing has no significant effect on prescription behavior, as $\beta = 0.123$ and $t = 1.395$, while the p -value > 0.05 , being much higher than 0.05, leads to the rejection of H2b. This means that direct marketing does not contribute to prescription behavior in this context. The relationship between attitude and purchasing behavior is positive, as indicated by a

$\beta=0.569$ and a t-statistic of 6.591, $p < 0.05$. This supports the statistical significance of this relationship. Therefore, H3 is accepted, demonstrating that attitude significantly enhances prescription behavior.

The results of H4a stated that pharmaceutical public relations significantly impact the attitude, as $\beta = 0.569$ and $t = 6.591$, while the $p\text{-value} > 0.05$, of physicians towards pharmaceutical promotional tools. This hypothesis is supported by the previous studies conducted by Negash and Adamu (2017) and Eldrwish (2022), which revealed that physicians' attitude towards pharmaceutical promotional tools is influenced by public relations. Hence, H4a is accepted. Similarly, the results of H4b indicated that pharmaceutical public relations and the prescribing behavior of physicians have an insignificant relationship. But previous studies found opposite results where public relations positively impacts the prescribing behavior of physicians. Therefore, the hypothesis H4b is rejected in the current study.

Similarly, the results of H5a and H5b stated that marketing has an impact on the attitude and prescribing behavior of physicians. But in the previous studies Kabir and Maulan (2022), opposite results were shown. The reason behind this can be that physicians receive a large number of promotional emails, messages, and calls that skip physicians' attention and get ignored. Secondly, the generic nature of emails, calls, and messages with specific clinical and patients' concerns makes them an ineffective source of information for physicians. The hypothesis H3 proved that attitude influences the prescribing behavior of physicians towards pharmaceutical marketing tools. This finding supports the well-documented relationship between attitude and behavior in different contexts (Luo et al., 2024).

Implications

The present study is based on a research model that links two promotional tools, i.e., public relations and direct marketing, with physicians' attitude and prescribing behavior. The study is based on the theory of reasoned action and supports the applicability and use of this theory to explain physicians' attitudes and their prescribing behavior. The positive impact of public relations shows that it serves as an important theoretical construct to shape physicians' attitude and behavior. The insignificant impact of direct marketing shows that not all types of promotional tools are effective for pharmaceutical marketing. Thus, this study positions these two promotional tools as distinctive communication factors that carry different impacts.

Public relations is an important component of the promotional mix as it enables an organization to develop a good image, high credibility, and communicate value to stakeholders. The pharmaceutical industry is characterized as a highly sensitive environment where transparency and credibility play crucial roles. Thus, pharmaceutical companies need to work a lot on public relations. There are several ways to improve public relations. Public relations can be made more effective by engaging physicians through scientific events, medical seminars, and meetings. These are considered high-level public relations activities to develop trust among physicians. Pharmaceutical companies should use evidence-based content to attract physicians. This can be in the form of real-world evidence, clinical data, and comparative studies. They can also invite key opinion leaders such as medical experts to write peer-reviewed medical articles related to pharmacy.

They can also create a positive image by sponsoring different courses and events related to medical education that raise awareness about different diseases and the role of medicines in curing them. Furthermore, pharmaceutical companies can demonstrate corporate responsibility through the use of sustainable manufacturing practices and ethical pricing. These initiatives would improve physicians' attitude and their prescribing behavior.

The results of the present study showed that direct marketing is an ineffective promotional tool to influence physicians' attitude and prescribing behavior. There are several reasons behind this, such as skepticism, untested

scientific claims, and information overload. Thus, pharmaceutical companies need to manage direct marketing in an effective and efficient way. Firstly, pharmaceutical companies need to understand physicians' needs by providing meaningful and useful information to them and by answering their queries. Secondly, promotional messages should be kept short and precise in order to save physicians' time, as they have a busy working schedule. They should also avoid exaggerated claims and use factual information to build physicians' trust. The choice of the right communication channels is also crucial to engage physicians. There are different communication channels to interact with physicians. Pharmaceutical companies need to do proper research to choose the communication channel that aligns with the preferences of physicians. Another important point is that communication should be aligned with the specialty of the physicians, which means that companies need to focus a lot on personalized communication. For example, Communication directed towards a dermatologist should be entirely different from that directed towards any other medical expertise.

Limitations

The present study has certain limitations that can be addressed by future researchers. The study considered only two pharmaceutical marketing tools, i.e., public relations and direct marketing, and ignored all other tools. Thus, future researchers should take into account remaining promotional tools in their study to study their impact on physicians' prescribing behavior and attitude. The study has ignored the mediating impact of attitude, which should be addressed in future. The present study did not incorporate any moderating variable, which leaves room for future researchers to study the impact of moderating variables such as physicians' knowledge, specialty, expertise, and experience. The other limitation of the study deals with its cross-sectional nature. Thus, future researchers are encouraged to use longitudinal studies to better understand physicians' prescribing behavior. The study was conducted in Pakistan, where the pharmaceutical environment is different from developed countries, thus limiting the generalizability of results. Future studies can be conducted in different country settings to understand this phenomenon.

References

- Aldin Sharifnia, S. H., Mohammadzadeh, M., Arzani, G., Salamzadeh, J., Abolfazli, S. A., Zali, A., & Khoshdel, A. R. (2018). Main factors affecting physicians' prescribing decisions: the Iranian experience. *Iranian journal of pharmaceutical research: IJPR*, 17(3), 1105. <https://pmc.ncbi.nlm.nih.gov/articles/PMC6094427/>
- Bagozzi, R. P., & Yi, Y. (2012). Specification, evaluation, and interpretation of structural equation models. *Journal of the Academy of Marketing Science*, 40(1), 8-34. <https://doi.org/10.1007/s11747-011-0278-x>
- Chaihanchai, P., & Anantachart, S. (2023). Encouraging green product purchase: Green value and environmental knowledge as moderators of attitude and behavior relationship. *Business Strategy and the Environment*, 32(1), 289-303. <https://doi.org/10.1002/bse.3130>
- Dialectia. (2025). The state of the pharmaceutical industry. <https://www.dialectica.io/blog/the-state-of-the-pharmaceutical-industry-growth-drivers-ai-disruption-and-competitive-strategies>
- Eldrwish, M. A., Aigbogun, O., Kani, Y., & Sambasivan, M. (2022). Attitude towards pharmaceutical promotional tools and its influence on physicians' prescribing behaviour in Sudan. *International Journal of Pharmaceutical and Healthcare Marketing*, 16(4), 469-489. <https://doi.org/10.1108/ijphm-03-2021-0036>
- Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intention and behaviour: An introduction to theory and research. In *Reading MA Addison Wesley*.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50. <https://doi.org/10.1177/002224378101800104>
- George, D., & Mallery, P. (2010). *SPSS for Windows Step by Step: A Simple Guide and Reference*. In Allyn & Bacon (10th ed.).
- Hair, J. F., Hult, G. T., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM) (2nd ed.)*. Sage.
- Hazeena, S. H., Chen, X., Yeh, C., Hsieh, C., Chen, M., Huang, P., Hou, C., & Shih, M. (2023). The relationship among knowledge, attitude, and behavior of workers on food safety in Taiwan's company a. *Journal of Food Science and Technology*, 60(4), 1294-1302. <https://doi.org/10.1007/s13197-023-05673-8>
- IQVIA. (2023). *The global use of medicines 2023*. <https://www.iqvia.com/events/2023/01/the-global-use-of-medicines-2023>
- Kabir, S. M., Maulan, S., Manaf, N. H., & Nasir, Z. W. (2022). The influence of direct-to-physician promotion towards physicians' prescription behaviour in Malaysia. *International Journal of Pharmaceutical and Healthcare Marketing*, 16(1), 101-122. <https://doi.org/10.1108/ijphm-10-2020-0089>
- Kluit, A. L., Beumer, A., Van Bennekom, C. A., De Boer, A. G., & De Wind, A. (2025). The association between attitude, perceived norm, and perceived behavioral control with the provision of clinical work-integrating care: A reasoned action approach. *PEC Innovation*, 7, 100416. <https://doi.org/10.1016/j.pecinn.2025.100416>
- Kotler, P. (2002). *Marketing places*. Simon and Schuster.
- Levy, R. (1994). The role and value of pharmaceutical marketing. *Archives of Family Medicine*, 3(4), 327-332. <https://doi.org/10.1001/archfami.3.4.327>
- Liu, C., Liu, C., Wang, D., Deng, Z., Tang, Y., & Zhang, X. (2019). Determinants of antibiotic prescribing behaviors of primary care physicians in Hubei of China: A structural equation model based on the theory of planned behavior. *Antimicrobial Resistance & Infection Control*, 8(1). <https://doi.org/10.1186/s13756-019-0478-6>
- Luo, J. M., Shang, Z., & Wu, S. I. (2023). Impact of employees' generativity on green policy attitude,

- environmental commitment, and green behaviour. *Journal of Environmental Planning and Management*, 67(14), 3645-3668. <https://doi.org/10.1080/09640568.2023.2232103>
- Mor, J., Kaur, T., Menkes, D. B., Peter, E., & Grundy, Q. (2024). Pharmaceutical industry promotional activities on social media: A scoping review. *Journal of Pharmaceutical Health Services Research*, 15(4), 1-11. <https://doi.org/10.1093/jphsr/rmae022>
- Negash, M., & Adamu, A. (2017). The impact of pharmaceutical promotion strategies on prescribing behavior of physicians a developing country experience: case of Addis Ababa, Ethiopia. *Pacific Business Review International*, 9(8), 9–18. https://doi.org/10.1057/9780230512634_3
- Piachaud, B. (2004). Competition in the Pharmaceutical Industry. In *Outsourcing of R&D in the Pharmaceutical Industry: From Conceptualisation to Implementation of the Strategic Sourcing Process* (pp. 34-55). London: Palgrave Macmillan UK.
- Pouratashi, M., & Zamani, A. (2022). University students' level of knowledge, attitude and behavior toward sustainable development: A comparative study by GAMES. *Journal of Applied Research in Higher Education*, 14(2), 625-639. <https://doi.org/10.1108/jarhe-06-2020-0163>
- Schlender, M., Hernandez-Villafuerte, K., Cheng, C., Mestre-Ferrandiz, J., & Baumann, M. (2021). How much does it cost to research and develop a new drug? A systematic review and assessment. *PharmacoEconomics*, 39(11), 1243-1269. <https://doi.org/10.1007/s40273-021-01065-y>
- Shakeel, S., Nesar, S., Iffat, W., Fatima, B., Maqbool, T., & Jamshed, S. (2019). A quantitative insight of the interactions of prescribers with pharmaceutical organization's representatives in clinical settings of Karachi. *Integrated Pharmacy Research and Practice*, 8, 75-83. <https://doi.org/10.2147/iprp.s196318>
- Spiller, L. D., & Wymer Jr, W. W. (2001). Physicians' perceptions and uses of commercial drug information sources: an examination of pharmaceutical marketing to physicians. *Health marketing quarterly*, 19(1), 91-106.
- Statista. (2023). Revenue of the worldwide pharmaceutical market from 2001 to 2022.
- Wang, Z., Wang, R., Li, X., Bai, L., Fan, P., Tang, Y., Li, X., Huang, Y., Nie, X., Han, S., Shi, L., & Chen, J. (2024). Influencing factors of generic prescribing behavior of physicians: A structural equation model based on the theory of planned behavior. *Risk Management and Healthcare Policy*, 17, 1375-1385. <https://doi.org/10.2147/rmhp.s446743>
- WHO. (1988). *Ethical criteria for medicinal drug promotion world health organization*. In World Health Organization. <https://iris.who.int/server/api/core/bitstreams/4d5f499f-3dcd-4eaa-8f9e-6d690ff93631/content>
- Yimenu, D. K., Demeke, C. A., Kasahun, A. E., Siraj, E. A., Wendalem, A. Y., Bazezew, Z. A., Atsbeha, B. W., & Mekuria, A. B. (2021). Health professional's exposure, attitude, and acceptance of drug promotion by industry representatives: A cross-sectional study in Ethiopia. *Science Progress*, 104(2). <https://doi.org/10.1177/00368504211029435>