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Interactions between physicians and pharmaceutical sales representatives in Saudi Arabia

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BACKGROUND AND OBJECTIVES: Interaction between physicians and pharmaceutical sales representative (PR) is a major component of the promotional activities by pharmaceutical companies. The lack of studies examining the magnitude of this interaction in Saudi Arabia is evident. The objective of this study is to estimate the magnitude and associated characteristics of physician-PR interaction.

DESIGN AND SETTINGS: A cross-sectional study was conducted among physicians working in the different regions of Saudi Arabia between March and July of 2012.

METHODS: A cross-sectional study was undertaken between March and July of 2012 in the different regions of Saudi Arabia. A self-administrated questionnaire was developed and handed to all participants, both in paper and electronic formats.

RESULTS: A total of 663 participants completed the questionnaire. The participation rate was 66.3% (663/1000). The majority of the participants (72.9%) reported interaction with PRs. This was lower among residents/interns compared to higher ranking employees (55.6% vs 83.6%, $P<.001$). Approximately half (48.3%) of the interactions occurred at a rate of more than once a month. A majority of the participants (72.1%) occasionally accepted gifts such as stationery (57%), drug samples (54%), meals (38%), and sponsorship of educational activities (30%). The following characteristics were independently associated with physician-PR interaction: non-Saudi nationals, a higher monthly income, Western medical education, working in a private hospital, being a specialist or registrar (rather than resident or intern), working on certain specialties (such as psychiatry and family medicine), and having limited number of patients with high socioeconomic status.

CONCLUSION: Although lower than seen in many parts of the world, a high prevalence of physician-PR interaction in Saudi hospitals is reported. Delineating associated characteristics may assist with future interventions. Further research should focus on ethical, clinical, prescription, and economic impact of interaction as well as determining the best strategy to reduce negative impact.

Marketing and promotional activities constitute a large portion of the budget of pharmaceutical companies.[1,2] It was estimated that the US pharmaceutical companies spent more than 10% of its sales revenue on promotional activities in 2008, which was calculated into tens of billions of dollars. More than half of this amount was used to cover the expenses of detailing on physicians, nurse practitioners, and physicians' assistants.[1,2] Furthermore, independent estimates of pharmaceutical expenditure on detailing and samples in the United States was twice that officially released.[3]

In the past few decades, the relationship between physicians and pharmaceutical industry is one of the most controversial ethical issues in medicine.[4-6] There is accumulated evidence that such relationships influence physicians' clinical decisions and researches.[7-9] For example, a review of 29 studies in the United States and other Western countries showed that different physicians' interactions with the pharmaceutical industry

was associated with nonrational drug prescription, frequent prescription of expensive medication, and formulary requests of medication that seldom apprehended the important advantages over the existing ones.[7]

Despite the compelling evidence of negative effects on physicians' behavior[7-9] and the presence of restrictive guidelines,[10-12] the interaction is still highly prevalent. For example, around 90% prevalence of interaction between physicians and pharmaceutical sales representatives (PRs) has been reported in recent large studies in the United States and Japan.[13-15] A number of studies from different parts of the world examined the demographical and occupational characteristics of physicians engaged in physician-PR interaction.[14,16,17] Unfortunately, studies examining the magnitude and relationship of this interaction are deficient in Saudi Arabia. The objective of the current study was to estimate the magnitude, types, and associated characteristics of physician-PR interaction in Saudi Arabia.

METHODS

Population

The current study was conducted among physicians working in major government and private hospitals in Saudi Arabia. All ranks of physicians, both medical and surgical specialties, were included. Hospitals in central, eastern, western, northern, and southern regions of Saudi Arabia were also included. Medical students, other health care workers, and physicians with no patient-care responsibilities were excluded. A PR was defined as a drug company employee who regularly visits physicians to provide information about the company's products.

Study design

A cross-sectional study was done between March and July of 2012. The study obtained all the necessary ethical approvals from the institutional review board of the Faculty of Medicine at King Saud University, Riyadh, Saudi Arabia.

Sample size

From previous studies,[13-15] the prevalence of physician-PR interaction was assumed to be 90%. We estimated that 138 participants were required to detect 90% prevalence with 5% accuracy. However, since the 2 groups (with and without interaction) were not assumed to be equal (given 90% prevalence), we estimated that 631 participants were required to detect 20% difference (for example, 50% vs 30%) of given characteristics between the 2 study groups, at 95% confidence level and 80% power. This number was adjusted to the possibility of 10% missing data. The calculation was done using OpenEpi software (version 2.2, Copyright (c) 2003, 2007 Andrew G. Dean and Kevin M. Sullivan, Atlanta, GA, USA).

Questionnaire

A self-administrated questionnaire was developed and handed to all participants. It included 30 questions arranged in 2 sections. All questions were provided in English. The first section (13 questions) assessed the sociodemographic, economic, and occupational characteristics of the studied participants. These included age, gender, nationality, monthly revenue, income satisfaction, category of hospital, main physician's duty, job rank, number of years employed, previous work history, specialty, and patients' socioeconomic status. The second section (17 questions) assessed the presence and (when present) the characteristics of the interaction, such as frequency, place, duration, communication methods, types of gifts offered, and acceptance. Additionally, the second section assessed the type of medical education obtained, any related ethical education obtained, and the knowledge of any local governing regulations for interaction. The scientific content of the questionnaire was validated by a multidisciplinary committee covering ethics, psychiatry, pharmacy, and epidemiology. The questionnaire was then piloted on a small number of participants (N=16) before widespread distribution. The phrasing and suggested answers were modified for some questions based on feedback from the pilot sample.

Recruitment

Because rosters were readily available for all of the physicians from hospitals scattered over a large geographic area, the questionnaire was distributed to available physicians at the time of the study, i.e., convenience sampling. The questionnaire was distributed by the authors of this study to a number of secondary and tertiary care hospitals in all 5 major regions of Saudi Arabia (central, western, eastern, northern, and southern regions). Informed consent was obtained from all the participants after explaining the objectives of the study. Both paper (75%) and electronic (25%) formats were used. The participation rate was 66.3% of contacted physicians (663/1000).

Statistical analysis

Data were presented using frequencies and percentage for categorical information, and mean and standard deviation (SD) for continuous data. The prevalence of in-

teraction was presented as percentage of those who answered yes to the question "Have you ever encountered a PR?" Socio-demographic, economic, and occupational characteristics were compared between those who reported and did not report interaction. Significant differences between the 2 groups were calculated using the chi-square test or Fisher exact test (as appropriate) for categorical data, and student t test for continuous data. Characteristics that were associated (significant or had a trend of significance) with physician-PR interaction in univariate analysis (above) were entered into a multiple logistic regression model to define independent relationships. Variables with $P>.10$ were eliminated and variables with $P<.05$ were retained in the model using conditional backward stepwise elimination. All P values were 2-tailed. $P<.05$ was considered as significant. SPSS, version 16.0 (SPSS Inc., Chicago, USA) was used for all statistical analyses.

RESULTS

A total of 663 participants completed the study questionnaire. Sociodemographic characteristics of the participants were shown in **Table 1**. About three-fourths (74%) of participants were male, and the average age was 38.2 (10.0) years. More than half (55%) of participants were Saudi. Almost half of the participants (47%) were from the central Region (Riyadh, the Kingdom capital) followed by the western region (27%). The most commonly reported monthly income was between 10 and 19 thousand Saudi Riyals. About one-fifth (22%) of the participants had other financial resources in addition to their main income as a physician. The majority (59%) were satisfied with their income.

The occupational characteristics of the study participants are shown in **Table 2**. Three-fourths of the participants were working in public hospitals. Almost all (96%) of the participants had clinical work assignments, either alone or with academic assignments. The percentage of residents or interns (37%) was slightly more than that of consultants and specialists/registrars (about 30% each). The average working duration was 12.2 (9.3) years. About one-fifth of participants had history of working in Western countries. The participants worked in more than 30 specialties, with the majority working in psychiatry, family medicine, internal medicine, surgery, and pediatrics. More than 60% of the participants described the socioeconomic status of their patients as fair.

More than 30% of participants had medical education in Western countries (**Table 3**). Slightly more than half of the participants were educated or oriented in the ethics of physician-industry relationships. These

Table 1. Sociodemographic characteristics of the studied participants.

	Overall N=663	Interaction with PRs		*P* value
		Yes N=483	No N=180	
Gender				
Male	485 (74.4%)	120 (71.9%)	47 (28.1%)	.817
Female	167 (25.6%)	353 (72.8%)	132 (27.2%)	
Age (y)				
Mean (SD)	38.2 (10.0)	40.1 (9.4)	33.2 (9.8)s	<.001
Age groups				
20-29	147 (22.9%)	62 (42.2%)	85 (57.8%)	<.001
30-39	232 (36.1%)	185 (79.7%)	47 (20.3%)	
40-49	156 (24.3%)	129 (82.7%)	27 (17.3%)	
≥50	108 (16.8%)	92 (85.2%)	16 (14.8%)	
Nationality				
Saudi	353 (54.7%)	228 (64.6%)	125 (35.4%)	<.001
Non-Saudi	292 (45.3%)	240 (82.2%)	52 (17.8%)	
Arabs	166 (56.8%)	134 (80.7%)	32 (19.3%)	.501*
Asian	25 (8.6%)	19 (76.0%)	6 (24.0%)	
Western	4 (1.4%)	3 (75.0%)	1 (25.0%)	
Unidentified	97 (33.2%)	84 (86.6%)	13 (13.4%)	
Saudi region				
Central	292 (47.4%)	201 (68.8%)	91 (31.2%)	.038
Eastern	84 (13.6%)	72 (85.7%)	12 (14.3%)	
Western	168 (27.3%)	121 (72.0%)	47 (28.0%)	
Northern	28 (4.5%)	19 (67.9%)	9 (32.1%)	
Southern	44 (7.1%)	34 (77.3%)	10 (22.7%)	
Monthly income (SR)				
<10,000	109 (16.9%)	43 (39.4%)	66 (60.6%)	<.001
10,000-19,000	266 (41.2%)	206 (77.4%)	60 (22.6%)	
20,000-29,000	110 (17.1%)	89 (80.9%)	21 (19.1%)	
≥30,000	160 (24.8%)	133 (83.1%)	27 (16.9%)	
Other income				
No	513 (78.2%)	367 (71.5%)	146 (28.5%)	.201
Yes	143 (21.8%)	110 (76.9%)	33 (23.1%)	
Income satisfaction				
Satisfied	380 (58.7%)	282 (74.2%)	98 (25.8%)	.587
Not sure	113 (17.5%)	86 (76.1%)	27 (23.9%)	
Dissatisfied	154 (23.8%)	109 (70.8%)	45 (29.2%)	

PR: Pharmaceutical sales representative, SR: Saudi Riyals.

Table 2. Occupational characteristics of the studied participants.

	Overall N=663	Interaction with PRs		*P* value
		Yes N=483	No N=180	
Type of hospital				
Public	474 (74.6%)	318 (67.1%)	156 (32.9%)	
Private	110 (17.3%)	101 (91.8%)	9 (8.2%)	<.001
Both	51 (8.0%)	48 (94.1%)	3 (5.9%)	
Main physician assignment				
Clinical	570 (90.6%)	413 (72.5%)	157 (27.5%)	
Academic	25 (4.0%)	19 (76.0%)	6 (24.0%)	.247
Both	34 (5.4%)	29 (85.3%)	5 (14.7%)	
Clinical job rank				
Consultant	176 (29.1%)	142 (80.7%)	34 (19.3%)	
Specialist/Registrar	189 (31.3%)	164 (86.8%)	25 (13.2%)	<.001
Resident/Intern	225 (37.3%)	125 (55.6%)	100 (44.4%)	
Others	14 (2.3%)	11 (78.6%)	3 (21.4%)	
Working duration (y)				
Mean (SD)	12.2 (9.3)	13.8±9.2	7.6±8.1	<.001
Duration groups				
0-9	293 (45.6%)	174 (59.4%)	119 (40.6%)	
10-19	197 (30.6%)	167 (84.8%)	30 (15.2%)	<.001
20-29	114 (17.7%)	95 (83.3%)	19 (16.7%)	
≥30	39 (6.1%)	36 (92.3%)	3 (7.7%)	
Previous work				
Western	122 (20.1%)	104 (85.2%)	18 (14.8%)	<.001
Non-Western	484 (79.9%)	327 (67.6%)	157 (32.4%)	
Specialty				
Psychiatry	114 (17.8%)	92 (80.7%)	22 (19.3%)	
Family medicine	78 (12.2%)	64 (82.1%)	14 (17.9%)	
Internal medicine	74 (11.6%)	55 (74.3%)	19 (25.7%)	
Surgery	71 (11.1%)	54 (76.1%)	17 (23.9%)	
Pediatrics	61 (9.5%)	51 (83.6%)	10 (16.4%)	
Orthopedics	42 (6.6%)	35 (83.3%)	7 (16.7%)	<.001
Obstetrics and gynecology	22 (3.4%)	20 (90.9%)	2 (9.1%)	
Emergency medicine	13 (2.0%)	12 (92.3%)	1 (7.7%)	
Otolaryngology	13 (2.0%)	11 (84.6%)	2 (15.4%)	
Anesthesiology	11 (1.7%)	3 (27.3%)	8 (72.7%)	
Not yet specialized	59 (9.2%)	12 (20.3%)	47 (79.7%)	
Others	81 (12.7%)	63 (77.8%)	18 (22.2%)	

Table 2 (cont.). Occupational characteristics of the studied participants.

Patients' socioeconomic status				
Low	145 (22.1%)	107 (73.8%)	38 (26.2%)	.084
Middle	408 (62.1%)	308 (75.5%)	100 (24.5%)	
High	16 (2.4%)	8 (50.0%)	8 (50.0%)	
Mixed or not sure	88 (13.4%)	60 (68.2%)	28 (31.8%)	

PR: Pharmaceutical sales representative.

Table 3. Education and knowledge of the studied participants.

	Overall N=663	Interaction with PRs		*P* value
		Yes N=483	No N=180	
Medical education				
Western	191 (31.2%)	156 (81.7%)	35 (18.3%)	<.001
Non-Western	422 (68.8%)	283 (67.1%)	139 (32.9%)	
Ethical education				
No	292 (46.2%)	205 (70.2%)	87 (29.8%)	.238
Yes	340 (53.8%)	253 (74.4%)	87 (25.6%)	
Types of ethical education				
Lectures	204 (62.2%)	146 (71.6%)	58 (28.4%)	.587
Workshops	38 (11.6%)	28 (73.7%)	10 (26.3%)	
Courses	22 (6.7%)	16 (72.7%)	6 (27.3%)	
Others	22 (6.7%)	19 (86.4%)	3 (13.6%)	
Multiple	42 (12.8%)	33 (78.6%)	9 (21.4%)	
Knowledge of rules and polices				
No	380 (62.1%)	270 (71.1%)	110 (28.9%)	.288
Yes	232 (37.9%)	174 (75.0%)	58 (25.0%)	

PR: Pharmaceutical sales representative.

were mainly lectures (62%), workshops (12%), or multiple sources (13%). Less than 40% of the participants thought that there were rules and polices in Saudi Arabia regulating physician-pharmaceutical industry relationships.

About 73% of the participants reported interaction with PRs. As shown in **Tables 1-3**, the frequency of interaction with PRs was significantly higher in older age compared to younger age groups ($P<.001$), non-Saudi nationals compared to Saudi nationals ($P<.001$), eastern region compared to other Saudi regions ($P=.038$), high income groups compared to low income groups (P for trend <.001), privately owned hospitals compared to public hospitals ($P<.001$), higher ranking jobs compared to resident or intern jobs ($P<.001$), longer working duration compared to shorter working duration (P for trend <.001), Western work history compared to non-Western work history ($P<.001$), Western education compared to non-Western education ($P<.001$), and higher in certain specialties more than others (example, 92.3% in emergency medicine vs 20.3% on not yet specialized). The following characteristics were independently associated with physician-PR interaction in logistic regression: non-Saudi nationals, higher monthly income, Western medical education, working in a private hospital, being a specialist or registrar (rath-

Table 4. Multivariate logistic regression OR of physician's characteristics associated with the interaction between physician and PRs.

Characteristic	Reference group	OR	Confidence intervals		*P* value
			Lower	Upper	
Non-Saudi nationality	**Saudi**	2.39	1.20	4.76	.014
Higher monthly income	**<10 000 SR**				.065
10 000-19 000		2.19	0.93	5.19	.074
20 000-29 000		3.49	1.17	10.45	.026
≥30 000		5.84	1.55	22.07	.009
Type of hospital	**Public**				.004
Private		5.53	1.64	18.68	.006
Both		9.08	1.07	76.96	.043
Clinical job rank	**Resident/Intern**				.002
Consultant		0.60	0.22	1.66	.328
Specialist/Registrar		2.96	1.34	6.50	.007
Speciality	**Others**				0
Psychiatry		3.06	1.16	8.08	.024
Family medicine		3.52	1.18	10.49	.024
Internal medicine		1.74	0.57	5.28	.329
Surgery		1.80	0.63	5.13	.269
Pediatrics		2.86	0.95	8.64	.062
Orthopedics		2.50	0.61	10.21	.201
Obstetrics and gynecology		4.51	0.47	43.09	.191
Emergency medicine		3.64	0.33	40.70	.294
Otolaryngology		1.17	0.16	8.43	.874
Anesthesiology		0.10	0.02	0.64	.015
Not yet specialized		0.25	0.06	1.05	.058
Patients' socioeconomic status	Mixed or not sure				.007
Low		1.02	0.41	2.52	.973
Middle		0.77	0.34	1.74	.526
High		0.06	0.01	0.31	.001
Western medical education	Non-Western	2.63	1.26	5.52	.01

PR: Pharmaceutical sales representative, OR: odds ratios.

er than resident or intern), working on certain specialties (such as psychiatry and family medicine but not anesthesiology or not yet specialized), and having patients with higher socioeconomic status (**Table 4**).

The characteristics of the physician-PR interaction are shown in **Table 5**. Almost half of the interaction (48%) occurred at a rate of more than once a month. Interaction typically occurred in the physician's clinic or office (82%), at conference or symposium (42%), and to a less extent outside clinic or office (8%). The majority of interactions (48%) took less than 10 minutes. Face-to-face conversation (39%) and phone calls (32%) were the most common methods of communication. About half (52%) of PRs (occasionally) offered gifts and the majority of physicians (72%) (occasionally) accepted. The most common gifts offered were stationery items

Table 5. Characteristics of the interaction between physician and PRs.

Frequency of interaction	
Once or less a month	239 (51.7%)
2-3 times a month	86 (18.6%)
Once a week	56 (12.1%)
2-5 times a week	50 (10.8%)
Nearly every day	31 (6.7%)
Place of interaction	
Inside clinic or office	380 (81.5%)
Clinic, within hours	175 (37.6%)
Clinic, after hours	160 (34.3%)
Office	122 (26.2%)
Outside clinic or office	37 (7.9%)
Restaurant/Cafeteria during my lunch break	17 (3.6%)
Parking area	13 (2.8%)
Coffee shop, restaurant, or mall outside workplace	9 (1.9%)
Conference/Symposium	194 (41.6%)
Others	26 (5.6%)
Duration of interaction (min)	
<5	125 (27.8%)
5-9	163 (36.3%)
10-14	93 (20.7%)
15+	68 (15.1%)
Communication methods	
Face-to-face	85 (38.8%)
Over the phone	71 (32.4%)
By e-mails	26 (11.9%)
More than one method	37 (16.9%)
Gift offer	
Never	66 (14.4%)
Rarely	156 (34.1%)
Sometimes	155 (33.8%)
Often	59 (12.9%)
Almost always	22 (4.8%)
Gift acceptance	
Never	64 (14.3%)
Rarely	61 (13.6%)
Sometimes	158 (35.3%)
Often	101 (22.5%)
Almost always	64 (14.3%)
Type of gift accepted	
Stationary, such as pens or notepads	212 (57.3%)
Free drug samples	200 (54.1%)
Free meals	140 (37.8%)
Attending CME events	111 (30.0%)
Non-industry-sponsored events	71 (19.2%)
Industry-sponsored events	63 (17.0%)
Funded research	25 (6.8%)
Prepaid promotion cards / codes	21 (5.7%)

PR: Pharmaceutical sales representative, CME: continuous medical education.

such as pens and notepads (57%), drug samples (54%), meals (38%), and financial support to attend educational activities (30%).

DISCUSSION

We are reporting the prevalence and types of physician-PR interaction and their associated demographic and occupational characteristics among groups of physicians of different specialities working in different regions of Saudi Arabia. The study showed that about 72.9% of the participants reported interaction with PRs. Although this is a high prevalence, it is considered lower than reported in many parts of the world that showed prevalence of around 90%. In addition, the frequency of interaction per month in the current study was also lower than reported in many Western studies[8,14,16] but was similar to some regional studies.[17] For example, in a review article published in 1993, Lexchin reported that 85% to 90% of doctors in the United States, Canada, Britain, and New Zealand meet PRs, on average twice every month.[8] Furthermore, around 90% prevalence was reported in more recent surveys in the United States examining huge multispeciality cohorts[13,18] as well as single-speciality cohorts, such as psychiatrists[15] and ophthalmology trainees.[19] Also, more than 90% prevalence was reported in studies examining physicians of different specialities in Japan[14] and Libya.[17] The lower prevalence of physician-PR interaction in the study may at least be partially explained by the inclusion of a considerable percentage (37%) of residents and interns who significantly had lower prevalence

of interaction than the other job ranks. Furthermore, a large percentage (>80%) of those working in public hospitals had significantly lower prevalence of interaction than those working in private hospitals.

The relationship of interaction with older age and longer working duration in univariate but not multivariate analysis may be explained by the fact that both characteristics were masked by the well concomitant higher income. Additionally, PRs usually aimed at physicians who are working in areas with no or loosely implemented restrictive rules and policies regarding exposure to industry.[14,16,17] This may explain the higher frequency of interaction among physicians working in private hospitals compared to public hospitals. Finally, the current findings suggested that the physician's speciality is a significant factor for the frequency of interaction. This was similar to previous studies that reported higher frequency of interaction among family physicians but lower frequency of interaction among anesthesiologists and nonspecialized physicians,[16-18] probably, reflecting the potential volume of prescription and the availability of time to meet with PRs. Supporting our results, psychiatrists in Vermont (United States) were among the top specialities to receive pharmaceutical gifts and payments.[20] Moreover, their interaction with pharmaceutical companies received higher public concern.[21] Interestingly, 18% of the 50 drugs intensively advertised in the United States are medications used to treat psychiatric and neurological disorders.[22]

Neither education about the ethics of the physician-industry relationship nor the knowledge of local policies to govern such relationship was associated with the frequency of physician-PR interaction in the study. Education and discussion about the ethical issues related to exposure to industry have been shown to change the attitude of residents and medical students toward interaction.[23-26] However, it is not clear if such intervention will be effective in reducing the frequency of interaction in the future. Additionally, the current findings suggested insufficient ethical education and limited awareness about local policies among the studied participants. Previous studies showed that 62% of physicians and 46% of residents were aware of the presence of any established local or professional guidelines concerning relationships with PRs.[27,28]

The majority of interactions in the study occurred in the physician's clinic or office. This may indicate a very tolerant work environment with regard to industry exposure. Similar to previous studies, gift acceptance in the current study was a common practice.[19,29] Drug samples and meals were the most common types of gifts offered by PRs.[14,29-31] However, attending continuous medical education events was lower than seen in many studies.[14,31] Previous studies indicated that accepting a gift is associated with a positive attitude toward interaction and the possibility of influencing the decisions of the physicians.[29,32]

The study has many advantages, which are listed as follows: bridging the local knowledge gap in physician-PR interaction, surveying a large number of physicians across wide geographic areas, assessing the frequency of interactions across different specialities, and detecting independent relationship factors of physician-PR interaction. Nevertheless, we acknowledge a number of limitations, being a convenience sample. The results should be generalized with caution and should not be regarded as representative to physicians working in Saudi hospitals. The response rate was 66%; however, this was similar to or even better than seen in many similar studies.[14,18,33] As a self-reported study, the possibility of underestimation, due to social desirability bias, cannot be excluded especially as the interaction may involve conflicts of interest.

In conclusion, although lower than seen in many parts of the world, we are reporting high prevalence of physician-PR interaction. Gift acceptance in the study was a common practice. Many characteristics were independently associated with this interaction, including nationality, income, type of education, category of hospital, job rank, speciality, and patients' socioeconomic status. Delineating associated characteristics may help plans of intervention. Further research should focus on ethical, clinical, prescription, and economic impact of physician-PR interaction as well as determining the best strategy to reduce any negative impact.

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