

ORIGINAL

ABSTRACT

TWO hundred and fourteen patients were interviewed to assess the degree of their compliance to prescription instructions and to identify factors that affected that compliance.

Patients instructed to take medications once per day and those given medications for nine days or less were found to comply significantly better than others, while those instructed to take medications four times daily and those given medications for ten to fourteen days had a significantly lower compliance. Patients younger than 25 years were found to have a significantly lower compliance than older patients. Sex, family size, type of drugs and number of drugs were not found to affect compliance.

Where possible, it is preferable to give the same daily requirement in less than four doses and to limit prescription to nine days or less. Otherwise the importance of taking medications according to instructions should be stressed, especially to patients where low compliance is expected.

INTRODUCTION

Why do some patients do adhere to instructions given to them for taking their medications? How many are they? And, what factors

Compliance and Its Determinants

AT A PRIMARY HEALTH CARE CENTER IN BAHRAIN

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affect their compliance to instructions? The answers to these questions are important when a physician tries to evaluate the efficacy or toxicity of his treatment. Non-compliance may be the inapparent

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reason behind failure of a treatment regimen. Thus, before a physician decides to "shift to another drugs" he should make sure that his patient is following his instructions.

Several studies have shown discrepancies between prescription instructions and the way patients actually take the drugs. Seventeen out of 22 patients did not comply with instructions and took either more or less than needed¹ and study of 200 elderly patients shows that 60% of them made error taking their medications, most often omission of doses².

Frequency has been the most commonly incriminated factor to affect compliance^{3,4}. Age was found to be another important factor. Patients younger than 25 years had a significantly lower compliance than older patients⁵.

Our study attempts to identify the size and nature of the problem of non-compliance at a primary health care center and to describe factors that contribute to this problem.

METHOD

This study was done at one of the 17 primary health care centers that provide free primary health care and free medications to the population of Bahrain. This health center serves around 30,000 people living in the small city of Jidhafs.

The study was done on two separate occasions to represent patients visiting the health center in winter time (first week of December 1981) and in summer time (first week of May 1982). During those two weeks, every fifth patient entering the health center was selected. To avoid memory bias patients who did not visit the health center during the previous four weeks were excluded from the study group. Each of the five health center physicians interviewed the patients that were referred to him and completed a questionnaire form for every drug that the patient was given during his past visit. Information was collected about the demographic characteristics of the patients as well as the way the drug was prescribed and the way it was taken. Patients who admitted not taking the medications for any reasons were excluded from the study, so were those who were not certain about the dose they have taken. Thus, all patients included in the study group claimed that they have faithfully followed the instructions given to them.

RESULTS

Eighty seven patients were interviewed during the first week of December and 127 patients were interviewed during the first week of May. The age and sex distribution of both groups were not significantly different (for sex $Z = 1.32$ $P > 0.1$, for age $t = 1.22$, 0.3 $P > 0.2$). A total of 214 patients were interviewed and a total of 392 questionnaires were completed. In 13 of those questionnaires, patients did not remember for how long they took their medications and were excluded when the effect of duration was analyzed. The mean age of the patients was 23.0 years and the standard deviation was 19.6. The age distribution of the study group is shown in Figure 1. Eighty six (40%) patients were males and 128 (60%) were females.

Of all patients, 72 (34%) complied well and the rest 142 (66%) did not comply.

Compliance was found to improve with increasing age (Figure 2), Patients younger than 25 years were found to have significantly lower compliance than older patients ($X^2 = 6.49$, $0.02 > P > 0.01$).

Different levels of compliance were also noted when the daily frequency of taking drugs was studied. Thirty drugs (8%) were taken more frequently than prescribed, while 73 drugs (19%) were taken less frequently (table 1). The best compliance was noted for once per day prescriptions (88%) followed by three times per day (77%), two times per day (75%), as needed (68%), and the lowest was for four times a day (49%) (Figure 3). Compliance to once a day prescriptions was found to be significantly better than compliance to other frequencies, while compliance to four times a day prescriptions was found to be significantly lower than compliance to other frequencies (Table 2).

Patients were found to comply best when instructed to take medications for one to three days or longer than 15 days (80% and 81%), followed by four to six days (65%), seven to nine days (63%), and the lowest compliance was to ten to fourteen days duration (Figure 4 and table 3). When the prescribed duration was one to three days, compliance was significantly better and when the duration was 10-14 days compliance was significantly worse (table 4).

Thirty two males (41%) complied well versus 46 females (58%). However, the difference was not significant ($X = 0.1186$, $0.8 > P > 0.7$). Compliance was also found to decrease with increasing family size; (Figure 5) the difference was again not significant ($X^2 = 5.35$, $df = 5$, $0.5 > P > 0.3$).

Thirty one percent of patients taking one drug showed good compliance as compared to 36% of those taking two drugs, and 29% of those taking three or more drugs. The differences were not statistically significant ($X^2 = 0.15$, $df = 2$, $0.95 > P > 0.90$).

When the type of drugs was considered, compliance to antibiotics was found to be significantly less than compliance to other drugs (Compliance 22%, $X^2 = 4.67$, $0.02 < P < 0.05$).

DISCUSSION

Of all demographic characteristics, age has been most often found to be the only factor affecting compliance. Some authors found that patients younger than 25 years had a significantly lower compliance than older patients⁶ while others found that the elderly² and those living alone⁶ deviated more frequently. On the other hand others found that age among other factors including social class, sex, education, occupation, income and marital status did not affect compliance^{7 8}.

Our study shows a significant effect of age on compliance with older people complying better than younger people. The peak "good compliance" for age group five to nine years was explained by the fact that 78 percent of those patients received anti-tetanic injections and analgesic drugs at the clinic in one single dose for traumatic injuries, thus compliance depended on the clinic nurse rather than on the patients or their mothers.

Frequency of taking a drug during the day was also often found to be a significant factor affecting compliance. Some found that compliance fell down with increasing number of daily doses of a drug;^{4 6} and a significant improvement in compliance when the frequency was decreased from four times daily to once daily.⁹ While in one

study when they questioned 200 patients on anti-rheumatic medications concluded that patients preferred the once per day regimen.¹⁰

Our findings are similar to most of the above. We noted however, that most patients who did not comply to four times a day instructions took three times a day (13 of 18) (Table 1). Four times a day prescriptions are not convenient for patients. We noted that patients try to relate taking drugs to meal times, thus the first question they usually ask after receiving the prescription is, "Should I take the medication before or after meals"? To us this explains taking three instead of four times a day. Although compliance to once a day was significantly better than compliance to other frequencies, however compliance to twice a day and three times a day were not significantly different. One, two and three times per day medication can be taken at meal times while four times a day cannot!

We found that compliance was worse when drugs were given for ten to fourteen days and the best compliance was to the shorter duration, except for drugs given for 15 days or longer.

Patients tend to comply to instructions when they are ill, after few days when they improve some of them stop taking the medications. Seventy-one percent of children given anti-biotics courses for ten days stopped after six days¹¹. In our study of 129 drugs that were not taken for the prescribed duration, 82 (64%) were taken for a shorter duration and 47 (36%) were taken for a longer duration than prescribed (Table 3). Patients given drugs for 15 days or longer were studied by type of drug and we found that 28% were on skin ointment, 24% on antacid and gastro-intestinal sedatives, 24% on anti-inflammatory analgesic, 19% on anti-diabetic and anti-hypertensive drugs and 5% on Ventolin tablets for asthma, thus

all patients were chronically ill and were used to taking drugs routinely.

Most studies have found that an increased number of drugs prescribed was associated with lower compliance.^{12 13 14} Some tried to explain this finding by the presence of an increased opportunity for error making with an increased number of drugs.^{15 16 17} Our study did not find any significant effects of the number of drugs on compliance.

When compliance was studied by type of drugs, it usually was antibiotics that had a lower compliance than other drugs.¹⁸ We found a significantly lower compliance to antibiotics than to other drugs. However, we also noted that all antibiotics were given four times daily and for a duration of ten to fourteen days. Thus non-compliance to antibiotics is most probably due to prescribed frequency and duration of taking the drugs, and not to the type of drug itself.

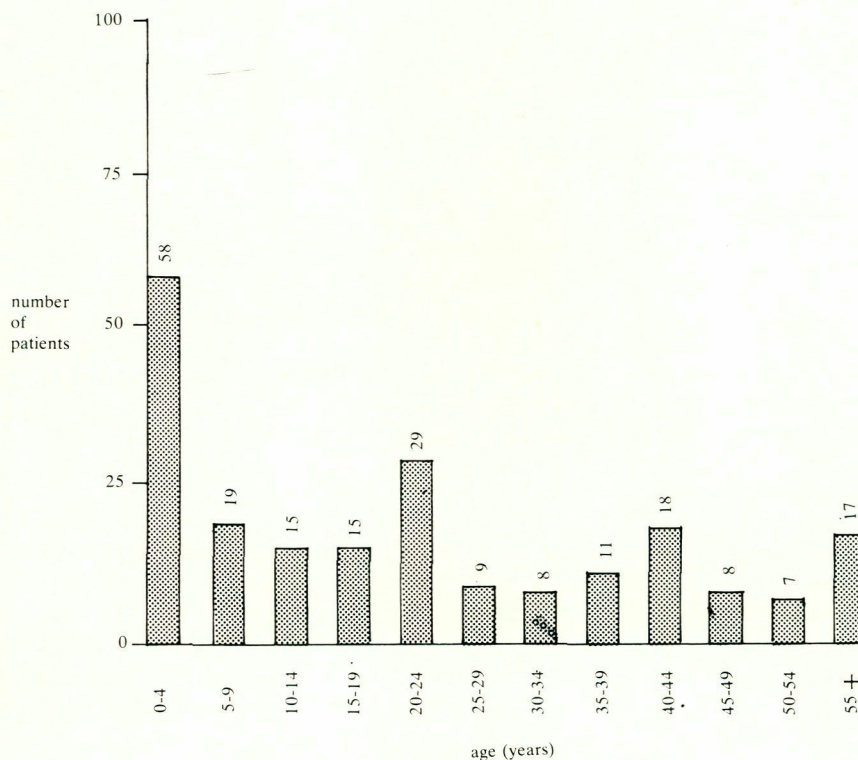


Fig. 1. Age distribution of (214) patients

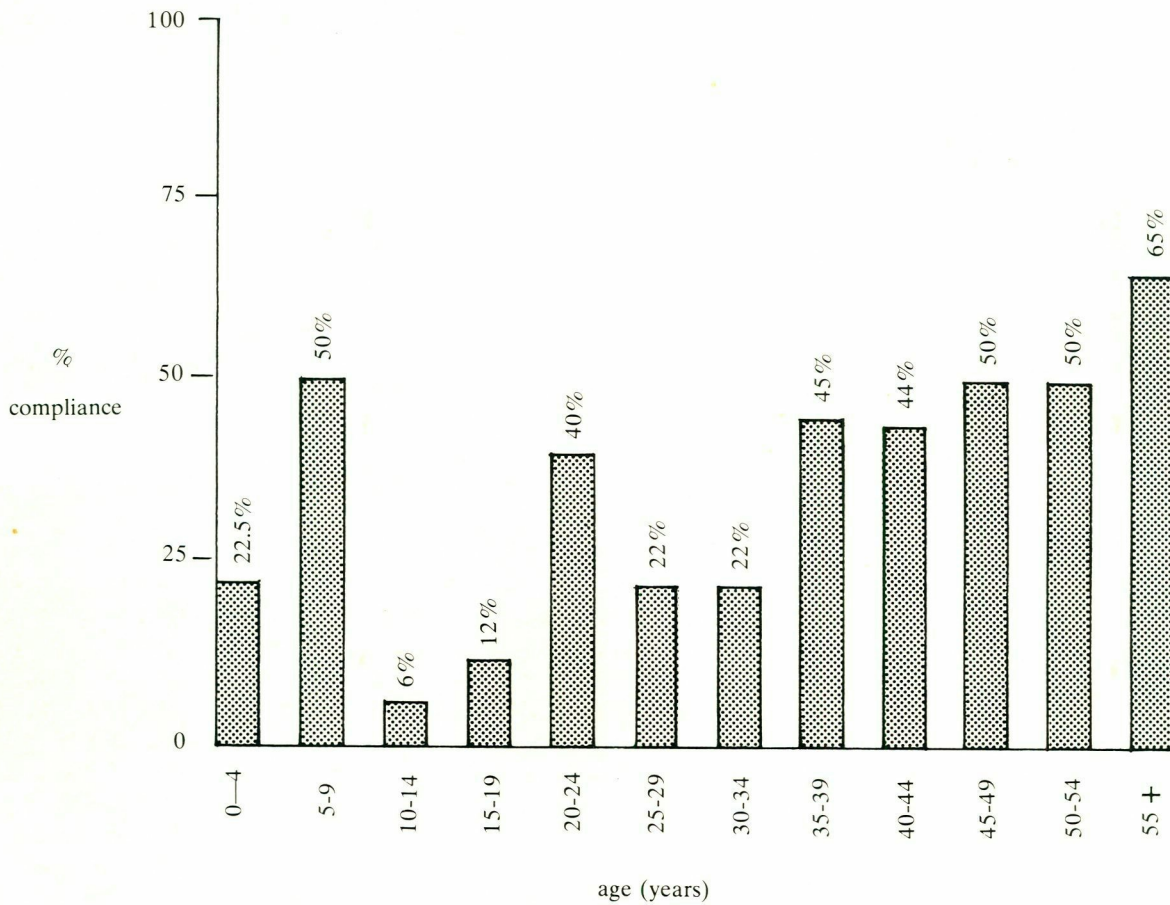


Fig. 2 , Percentage compliance by age of (214) patients

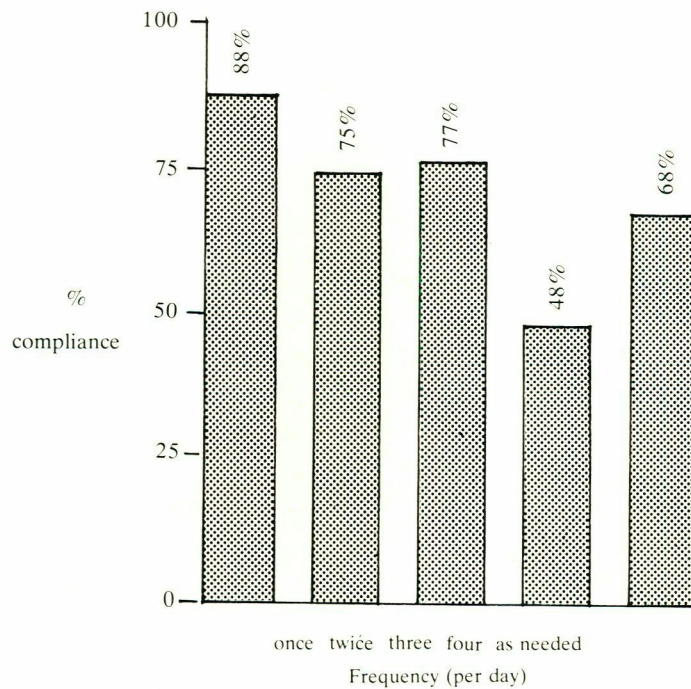


Fig. 3, % compliance by prescribed frequency

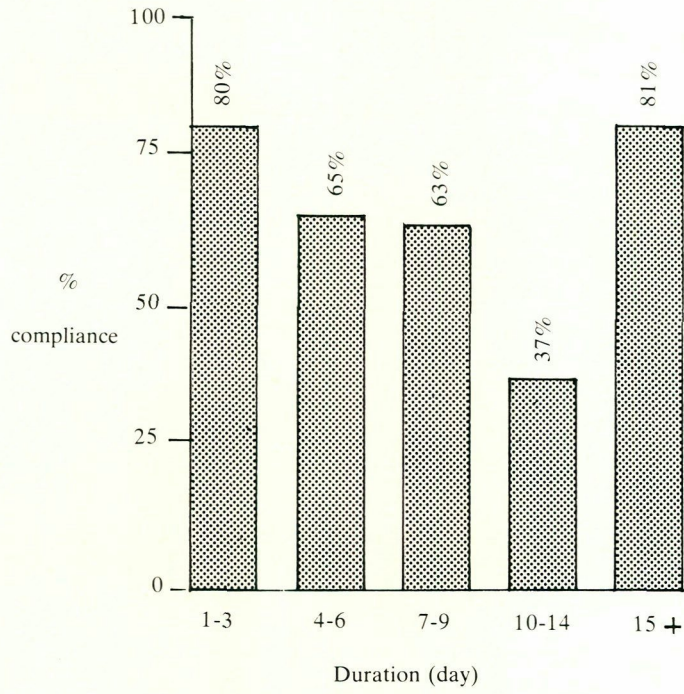


Fig. 4, % compliance by prescribed duration

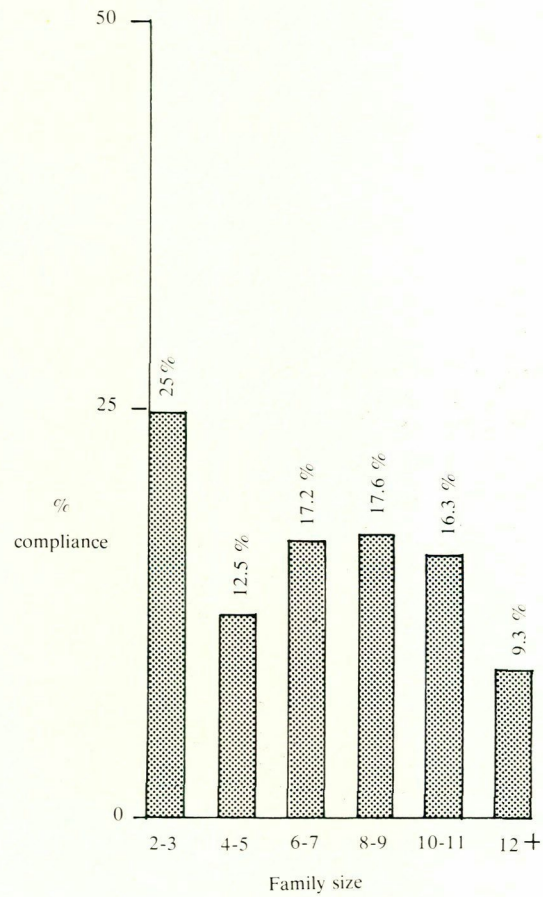


Fig. 5, % compliance by family size

Frequency prescribed/day

Frequency taken/day	Frequency prescribed/day					TOTAL
	once	twice	three times	four times	as needed	
once	36	6	8	1	8	59
twice	4	45	17	4	3	73
three times	—	5	140	13	8	166
four needed	—	1	.2	17	5	25
as needed	1	3	14	—	51	69
TOTAL	41	60	181	35	75	392

Table No. (1) Comparison between the frequency as prescribed v.s. frequency as taken by the patients.

COMPARISON BETWEEN COMPLIANCE TO VARIOUS FREQUENCIES

	once v.s. others	twice v.s. others	three times / others	four times others	as needed v.s. others	four times / once	four times / twice	four times / thrice
X^2	3.87	0.0002	1.72	11.4	1.33	11.98	5.69	10.83
P.	.02 < P < .05	> 0.98	.2 > P > .1	< .001	.3 > P > .2	< .001	.01 < P < .02	< .001

Table No. (2), Comparison among compliance to various prescribed frequencies.

		Duration prescribed					
Total of 379		1-3	4-6	7-9	10-14	15 +	Total
duration taken	1-3	60	38	9	3	—	110
	4-6	8	106	16	5	4	139
	7-9	7	14	53	7	—	81
	10-14	—	4	6	13	—	23
	15+	—	—	—	9	17	26
	Total	75	162	84	37	21	379

Table No. (3) Comparison between the duration as prescribed v.s. duration as taken by the patients.

Comparison with others	X	P
1-3 days	7.71	.001 < p < 0.01
10-14 days	15.53	p < .001
15+ days	1.63	0.2 < p < 0.3

Table No. (4) Comparison among compliance to various prescribed durations.

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