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Patients' adherence/compliance to physical therapy home exercises

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Research Article

Purpose: The purposes of this study were to evaluate patients' adherence to home exercise programs in physiotherapy practice in Turkey, and to learn which factors of patients', therapists', care or surroundings have an effect on patients' adherence to home exercises. **Material and methods:** Eighty two out-patients have participated in this study. Fifty eight subjects were females (70.7%) and 24 (27.3%) were males. Subjects' age ranged from 16 to 75 years old. Seventy five (91.4%) of the subjects had exercises prescribed to them in a range of one week to several months ago. Demographics, personal, treatment/disease, patient – therapist communication data was collected by means of a questionnaire, specially developed for this study. Twenty-five questions were presented with answers on a 5-point scale. Subjects were evaluated during treatment visits to physiotherapy clinics. **Results:** Hundred percent adherence to home exercises was found in 39% of the cases. Following factors were found to have correlation with adherence: "gender", "external motivation", "exercises role in overall rehabilitation", "understanding of exercises", physiotherapist's "verbal" and "visual" explanation, "physiotherapist's explanation quality", "reassessment of home exercises" and "satisfaction with physiotherapist" ($p<0.05$). **Conclusion:** This study reconfirmed the adherence rate to home prescribed exercises and found a number of a new factors that have an effect on the process. Based on these findings a physiotherapist should re-think and re-evaluate the time spent on explaining home exercises to patients.

Key words: Exercise, Patient adherence, Patient compliance.

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Fizyoterapide hastaların ev egzersiz programına olan uyumu/katılımı

Amaç: Bu çalışma, Türkiye'deki hastaların fizyoterapi ile ilgili ev egzersiz programlarına olan katılımını değerlendirmek ve ev egzersiz programlarına olan katılımda, hasta, fizyoterapist, tedavi veya çevresel faktörlerden olan etkilenimi incelemek için yapıldı. **Gereç ve yöntem:** Bu çalışmaya 82 dış hasta katıldı. Hastaların 58'i (% 70.7) kadın, 24'ü (% 27.3) erkekti. Yaşları 16-75 yıl arasında değişmekteydi. 1 hafta ile birkaç ay öncesinden 75 hastaya (% 91.4) ev egzersiz programı verildi. Hastaların demografik, kişisel, tedavi/hastalık ve hasta-fizyoterapist iletişim bilgileri, bu çalışma için özel olarak geliştirdiğimiz bir anket kullanılarak kayıt edildi. Bu ankette, 5 puanlık cevapları olan 25 soru yer aldı. Hastalar bu soruları, fizyoterapi ünitelerine geldikleri zaman cevaplandırdılar. **Sonuçlar:** Hastaların % 39'unun ev programına tam katılım gösterdiği bulundu. Hastaların, ev egzersiz programına olan katılımı ile, yaş, çevresel motivasyon, egzersizleri anlama, rehabilitasyon programındaki egzersizlerin rolü, fizyoterapistin egzersizleri açıklama kalitesi, ev egzersizlerinin fizyoterapist tarafından kontrolü ve yeniden değerlendirilmesi, hastanın fizyoterapiste olan memnuniyeti gibi parametreler arasında da anlamlı ilişkiler bulundu ($p<0.05$). **Tartışma:** Bu çalışma, hastaların ev egzersiz programına olan katılım oranlarını ve katılıma etki eden birçok yeni faktörü ortaya koydu. Buna göre fizyoterapistler, hastaya ev egzersizlerini verirken veya açıklarken bu sonuçları göz önünde bulundurmalı ve hastaları buna göre yeniden değerlendirmelidir.

Anahtar kelimeler: Egzersiz, Hasta uyumu, Hasta katılımı.

Success of many treatment protocols is largely determined by compliance to home exercise program by the patients.[1-4] However actual rates of patients' adherence to home exercises are found to be not as high as many physiotherapists would like them to be[5]. Performance of exercises by patients at home is largely out of control of the physiotherapist, therefore, predicting adherence rates and knowing which factors might have an influence on a patient is very crucial for overall outcome of the treatment.[1-4]

In a field of medicine and physical therapy, in particular there is ongoing debate about the use of terms "adherence" and "compliance". Compliance is defined as "action of yielding to pressure, demand, or coercion" or alternatively "the inclination or readiness to yield the demands of others often in a servile or spinless fashion"[6]. Definition of term "adherence" is "steady or faithful attachment" or "continued observance".

The verb adhere means "to hold, follow, or maintain loyalty" or "to be consistent or in accord"[6]. Based on definitions the term adherence comes' more relevant in modern physiotherapy, where a patient will discuss the effects of treatment and home exercises on him or here.

A number of factors which can have an effect of patients' adherence to physical therapy home exercise program were identified during previous studies and theoretically.[4] Three main groups of factors can be separated, which are "personal variables", "treatment/ disease variables" and "patient-therapist interaction". Major factors and groups which they belong to are drawn in Table 1.

However, the process of adherence to home exercises is very broad in terms of timing and specific methods of evaluations. There is still lack of evidence studying different factors at different phases of patient's rehabilitation as well as different types of patients.

The main aims of this study were to learn the rates of adherence to home exercises in general musculoskeletal group of Turkish patients and to understand which factors have an effect on patients' adherence within the short-terms of out-patient treatment.

MATERIALS AND METHODS

Eighty two out-patients participated, from four units in the Department of Physiotherapy and Rehabilitation of Faculty of Health Sciences (Unit of Orthopedic Rehabilitation, Unit of Sport Rehabilitation, Units of Hand and Rheumatology Rehabilitation) and one department of General Physical Therapy of Hacettepe University Hospital, Ankara, Turkey. Age group distribution is shown in Table 2. Fifty eight of the participants (70.7%) were females.

Following criteria were applied to select participants: out-patients with minimal of one week of physiotherapy treatment course, to whom home exercises were prescribed were selected. Age group borders were set between 16 and 75 years on assumption that patients of this age group could do their exercises independently. The study population was also narrowed down to musculoskeletal/orthopedic patients with sub-acute symptoms of disorders.

A number of exclusion criteria were set also subjects with learning or understanding disabilities as well as with diagnosed psychological problems were excluded. Top level athletes had to be eliminated due to possibility of extra high motivation to perform exercises dictated by sport goals or even financial benefits. Finally patients with an acute stage of impairments or with chronic impairments lasting over 3 years were eliminated from this study.

Based on literature studies,[1,4] and previous investigations[7] an original 5 point questionnaire was developed for this study. The questionnaire was asking about the adherence to prescribed exercises within previous week. The questionnaire was anonymous and patients were informed about the anonymity of the study.

In order to assess adherence and other factors a five-point scale was used, except for gender variable, which had only two possible responses. Possible answers to questions were categorized by ranks in ascending pattern from minimal to maximal. Exceptions were made to questions, answers on which could not be categorically ranked. These exceptions apply to questions

number 2 – gender, number 9 – exercising inhibiting factors and number 25 – reasons for not performing the home exercises program during the previous week. A total of twenty five questions were formulated, see Appendix.

Upon establishing the patient's eligibility for participation in the study, the questionnaire was handed out to patients by one of the researcher. Mostly patients completed the questionnaire inside the clinic, and returned it within the same day. However some patients opted to fill out questionnaire at home, so they returned it the next treatment session. In case of difficulties in understanding some questions, a patient was encouraged to ask help from a researcher.

The study was approved by supervisors of the department and units. No need for approval from the ethical committee was required since the study was not experimental. All patients were informed about the study and gave their approval prior to submission of the questionnaire.

Statistical analysis:

Statistical Package SPSS version 11.0 was used to analyze the data. The answers to the questions were ranked for statistical analysis. "Descriptive statistics – frequencies" function was used to analyze different factors of research subjects. "Two tailed", "Pearson correlation test" was used to study positive or negative correlation of different factors with patients' adherence level. The significant differences between different patient groups on a matter of adherence to home exercises were established by means of Chi-square test and one way analysis of variance ANOVA test. Statistical significance was set at $p<0.05$. A number of associated factors were grouped to form a new factor for statistical analysis. In results this factor are named "Pooled".

RESULTS

Adherence level to home based exercises is represented in Table 2, – completion of exercise session throughout the week, and Table 2, – completion of exercise repetitions in an average session. In addition combined adherence level is presented in Table 2, – showing pooled adherence rate of two previous measurements. 35 people or 42.7% gave their reasons for not performing home exercises. 14.3% referred to pain, 2.9% physiotherapist's advise, 51.4% lack of time 2.9% due to other medications and finally 28.6% had other reasons not to do home exercise program.

Based on Pearson correlation test, the Table 3 will show which factors were found to have a significant effect on overall adherence to home exercises.

DISCUSSION

In our study 100% adherence was recorded in 39% of patients. This result was similar to 35% reported by Basset[1], which was still lower than 50% adherence to medical advice by health psychology, Sarafino[4]. The study of Rebecca Folkan on older patients with impaired balance showed that, at post discharge, 36.6% of patients did not perform home exercise program and only 28.2% did their exercises four and more times per week.[18] In our study, if to summate "good" and 100% adherence rate the outcome value will result in 70.7%. Several studies have recorded similar high rates of adherence. Jette et al, reported 76% adherence to 90% of exercises in non-patient elderly population.[19] Similarly, Pisters et.al., observed 75% adherence at 13 weeks and 59% adherence at 65 weeks following exercise prescription and behavioral graded activity program for people with osteoarthritis.[20] Sjosten et al reported that 47% of elders, who followed fall prevention program, were 67-100% adherent to home exercises, however, the results are not very accurate since just number of exercise sessions was recorded and home diaries were used as a means of recording data.[21]

Our results also show that patients were better performing number of exercises per session 74.4% than number of session per week 69.5%, counting 100% and "good" adherence together. This could be explained by idea - "since a person started to do home exercises during one session, then he/she is likely to finish doing all number of exercises during that session" In the extensive study by Cyatro et al, an alternative definitions of

Table 1. Factors associated with adherence to home exercises.

Patient's personal variables	Treatment / disease variables	Patient – Therapist interaction
-Age[4,7]	-Severity of disease[3,10,13,14]	- Patient – therapist communication[1,3,8,11]
-Gender[4,7]	-Duration of treatment[4]	- Patient – therapist relationship[1,11,13]
-Educational background[4,7]	-Effect of disease on patient's life[3,10,11,13,14]	- Therapist rehabilitation monitoring[1,7,11]
-Religion[4]	-Complexity of treatment (exercises)[1,4,12,15]	
-Cultural norms and values[4]	-Belief in effect of exercises[1,4,7,12,14,16]	
-Personal exercise experience[4,8,9]	-Timing of treatment appointments[17]	
-Personal or social motivation[1,3,10-13]		
-Personal health beliefs[4,12]		

Table 2. Age groups of the patients, performance of exercises in a week and in a session, and overall exercises performance pooled.

	Frequency (%)
Age groups	
16 – 24 years	10 (12.2)
26 – 34 years	13 (15.9)
35 – 44 years	10 (12.2)
45 – 64 years	44 (53.7)
65+ years	5 (6.1)
Performance of exercises in a week	
I did not manage to do exercises	2 (2.4)
I performed exercises a few times	7 (8.5)
I have done about a half of my exercises	16 (19.5)
I managed to do more than half of exercises	22 (26.8)
I performed exercise program exactly as prescribed	35 (42.7)
Performance of exercises in a session	
I did not manage to do exercises	1 (1.2)
I completed about ¼ number of repetitions	7 (8.5)
I completed about ½ number of repetitions	13 (15.9)
I performed about ¾ number of repetitions	12 (14.6)
I performed prescribed number of repetitions	49 (59.8)
Overall exercises performance pooled	
No	2 (2.4)
Poor	6 (7.3)
Moderate	16 (19.5)
Good	26 (31.7)
100%	32 (39.0)

Table 3. Correlation of different factors and patient's adherence to home exercises.

	r (p)
Age	0.155 (0.165)
Education level	-0.186 (0.096)
Regular recreational activities	0.163 (0.146)
Sport participation	0.172 (0.123)
Patient's general activity level pooled	0.200 (0.073)
Belief in exercise benefit	0.138 (0.215)
Motivation	0.235 (0.035)*
Disease severity	-0.02 (0.859)
ADL limitations	0.104 (0.350)
Overall disease effect	0.061 (0.588)
Exercise prescription period	-0.139 (0.214)
Number of exercises	0.131 (0.242)
Exercise complexity	-0.029 (0.793)
Exercise fatigue level	0.040 (0.720)
Total exercise complexity pooled	0.054 (0.632)
The role of exercises	0.226 (0.044)*
Treatment progress	0.186 (0.131)
Understanding of exercises	0.234 (0.035)*
Physiotherapist's verbal explanation	0.249 (0.024)*
Physiotherapist's visual explanation	0.234 (0.035)*
Physiotherapist's overall explanation quality pooled	0.342 (0.002)*
Reassessment of home exercises	0.313 (0.005)*
Satisfaction with physiotherapist	0.311 (0.004)*

* $p<0.05$.

terms related to adherence, such as, "retention" – as participation in the exercises program, "adherence" – as following the number of exercise sessions and "compliance" – as completion of number of exercises in a session, were used. The relevant results to our study show that 74% of participants performed 75-100% exercise sessions within first 20 weeks and just 39.5% within weeks 22-46. In addition, within the 20 weeks just 34% of participants performed target number of set and repetitions. The described study was based on elderly patients performing group or home resistance training exercises[22].

Majority of other studies did not find age factor to have an effect on patient's adherence to home exercises.[14,19,23] The only study reporting contrary was by Brewer et al.[16] The only other investigation, with results similar to ours, which found ladies to be more adherent to home exercises was by Sluijs et al,[7] whereas most of other studies did not find a link.[2,4,14,23] To our surprise, and despite numerous reports,[8,24,25] past regular activities and exercise-sport experiences of patients were not associated with adherence to home exercises. Overall general activity level was found to have positive tendency towards predicting higher adherence, however it did not reach a significant level in our investigation. This is in accordance with a reviews by and Jack et al,[26] and Bassett's review,[1] referring to research done

by Daly et al. Possibly further investigations are required in this field. Ninety three percent of our patients thought of exercises as being highly effective. However, this did not have an effect on their performance of exercises, which is not consistent with Jette et al.[19] More than a half 53.1% of studied patients received high support to do their exercises from people close to them. As confirmed by literature and results of our study, social support increases adherence to home exercises.[1,4,10,11,17,26]

The surprise to us was to find that neither disease severity and activities of daily living limitations nor overall disease effect, did not moderate adherence level to home exercises. Pain level was found to correlate with adherence to home exercises in some studies,[10] but not in others, [14,23] Pain measurements were beyond the scope our study, therefore could not be compared with others. Three factors of complexity of home exercise programs appeared to have no effect on adherence. The number of exercises, complexity of exercises and the level of fatigue during exercise performance did not correlate with overall adherence. The study of Henry et al,[15] found significant differences between adherence levels in patients with 2 and 8 prescribed home exercises. However, the limitation of that study was the number of patients involved, which were 15. Henry's and other's studies differ from our findings. Factors as "patient's perception of importance of home exercises in overall rehabilitation" and "treatment progress" were found not to have an effect on patient to perform prescribed exercises.[1,4]

A number of factors regarding patient-therapist relationship: "patients' understanding of exercises", "physiotherapist's verbal explanation", "physiotherapist's visual explanation" and "physiotherapist's overall explanation qualities" were found to have a strong effect on patient's performance of home exercises. This was the first attempt to study the above factors with relation to patient's adherence to home exercises, no prior literature studied these aspects. In a study by Schoo et al, proper explanation of exercises provided with a visual brochure was found to be sufficient for correct performance of home exercises, with no need in additional materials like audio or video recordings.[27] Mazieres et al, also has indicated that increase education and information about home exercises improves patients' adherence to exercise program.[24]

Frequent reassessment of patients' home exercises strongly facilitated patients to do exercises. It must be said that only 60% of all therapists actually do periodical or constant follow-ups on patients' performance of exercises, while 6.4% did not and 16.7% did it rarely. Failing to do follow-ups by physiotherapists can create a range of additional problems starting from differences in perception of compliance Kirwan et al,[5] and finishing with lack of understanding of the exercise program by patients. In addition to that periodical follow-ups can be valued as monitoring and supervision of patients home exercises performances. In the study of Moseley, the greatest adherence rate was 89.05% in a group which knew they were monitored and used diaries and just 68.46% in a group of patients which had no knowledge about monitoring, and used no diaries.[28] The additional result of this study was measuring an approximate overestimation rate by patients who filled the diaries. This rate is about 10%.[28] Similarly, Pisters et al, reported greater adherence to home exercise program in people who additionally also participated in behavioral graded activity program. Seventy five percent adherence in experimental group is compared with 44% in control group at 13 weeks of exercise program.[20] In this case behavioral graded activity program in experimental group can be viewed as a method to monitor and follow up the prescribed exercise program, which apparently resulted in better adherence to exercise program. The problem of lack of monitoring and supervision over prescribed exercises to patients was also reported in Ireland, where in national survery only 56% of physiotherapists provided supervised exercise programs.[29]

To conclude based on results of this study, it is very important to recognize the effects of patient – therapist relationship on adherence of patients to prescribed home exercises and on

treatment result eventually. More attention should be spent on explaining home exercises and doing follow-ups. This gives the opportunity for physiotherapists to improve themselves and to improve the health care they provide.

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Appendix. Questions of the questionnaire.

	Demographic factors of patients
1.	Age
2.	Gender
3.	Education level
4.	Occupation
5.	Regular recreational activities
6.	Personal exercising norms
7.	Personal believe in effect of exercises
8.	External motivation to do home exercises
9.	Exercising inhibiting factors
	Disease / Treatment variable factors
10.	Personal perception of disease severity
11.	Limitation of daily activities
12.	Period of home exercises program prescription
13.	Relative number of exercises
14.	Relative complexity of exercises
15.	Fatigue level during exercises performance
16.	Importance of home exercises in overall treatment
17.	Overall treatment progress
	Patient - Therapist Interaction
18.	Patient's understanding of exercises
19.	Physical therapist's verbal exercises explanation
20.	Physical therapist's visual exercises explanation
21.	Physical therapist's follow up about patients home exercise program performance
22.	Patient's overall satisfaction of their physical therapist
	Patient adherence to home prescribed exercises program
23.	Number of sessions relatively to prescribed number, did he or she perform during last week?
24.	Number of repetitions relatively to prescribed number; did a patient normally perform during one exercise session of previous week?
25.	Reasons for not doing home exercises during the previous week