

Predictors of good compliance in adolescents with epilepsy

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The purpose of this paper was to describe the factors that predict compliance in adolescents with epilepsy. Altogether 300 individuals aged 13–17 years were randomly selected from the Finnish Social Insurance Institution's register. Every fifth person on the list was included in the sample. Seventy-seven per cent ($N = 232$) of the selected adolescents with epilepsy returned the questionnaire.

The data were analysed with SPSS software. Using the logistic regression model, the compliance of adolescents with epilepsy was predicted on the basis of support from physician and parents, motivation and the disease not being a threat of social well-being. The most powerful predictor was support from the physician. The likelihood of adolescents supported by their physicians complying with their health regimens was 10.56-fold compared with the adolescents who did not receive support from their physicians. Another powerful predictor was support from parents. The adolescents who received support from their parents complied with the health regimens with a 10.47-fold likelihood compared with adolescents who did not receive support from their parents. Adolescents with good motivation were 9.77 times more likely to comply than adolescents who did not have good motivation. Adolescents who did not feel the disease to be a threat to their social well-being complied with health regimens with an 8.38-fold likelihood compared to those who felt the disease to be a threat to social well-being.

The value of the -2Log likelihood was 64.68 and the goodness of fit index was 214.735. The value of Nagelkerke was 0.893, which indicates that the logistic regression model explains 89% of the variance. The model predicts correctly 97% of compliance in adolescents showing good compliance. These values show the logistic regression model to be good and to match well with the data.

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Key words: compliance; adherence; adolescence; chronic disease; epilepsy.

INTRODUCTION

Epilepsy is a chronic condition requiring a lifelong process of compliance with health regimens. Lack of compliance is a major problem in adolescents with chronic disease, with earlier studies showing approximately 50% of young people with long-term conditions not complying with care^{1–3}. There are not many studies concerning the compliance of adolescents with epilepsy, and most of those available have focussed especially on compliance problems with self-medication. According to Kyngäs⁴, 20% of adolescents with epilepsy felt that they complied fully with health regimens, while 44% placed themselves in the category of satisfactory compliance, and the remaining 34% reported poor compliance. Compliance with the recommended life-style was poorest, while the highest degree of compliance was observed for medication.

There is no generally accepted definition of compliance. Sackett⁵ defines compliance as the extent to which a person's behaviour coincides with medical advice. The term 'compliance' itself is laden with connotations of paternalism, coercion and acquiescence. Thus, the concept has attracted widespread criticism, and alternative concepts have been proposed, i.e. adherence, co-operation, mutuality, and therapeutic alliance^{6–9}. In nursing, compliance is seen more widely as behaviour coinciding with medical advice. Recently, it has been defined as an active, intentional and responsible process of care, in which the individual works to maintain his or her health in close collaboration with health carers^{2,10}. Instead of simply following the medical instructions that are laid out, the individual's active commitment to care is emphasized.

Although compliance and factors associated with it have been extensively studied, very little is known

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about the factors associated with good compliance of adolescents with epilepsy. There are some studies^{4, 10–12} of factors associated with the compliance of adolescents with epilepsy. Compliance with medical treatment can be improved by establishing good relationships between the client and health care staff^{4, 10}. Also, support from parents and other family members and friends is considered crucial for the compliance of adolescents with epilepsy¹¹. Social dependence has been shown to be more common among adolescents with diabetes and epilepsy than among healthy peers^{10, 12, 13}. The role possibly played by the stigma of epilepsy in adolescents' compliance is also unclear^{14, 15}. Moreover, earlier studies have not indicated the predictors of good compliance among adolescents with epilepsy. The purpose of this paper is to identify the predictors of good compliance among adolescents with epilepsy. This paper is based on an earlier study of compliance of adolescents with epilepsy⁴. Based on those findings, good motivation, a strong sense of normality, subjective outcomes, energy and willpower, support from parents, physicians and nurses, and a positive attitude towards to the disease and treatment, no threat to social and emotional well-being, no fears of complications, and no fear of seizures explained compliance ($P < 0.001$). However, these findings do not indicate the factors that predict good compliance, and logistic regression was applied to determine them. An answer was sought to the question: Which factors predict good compliance of adolescents with epilepsy? This is a particularly important subject to study, because we have to know the factors that predict good compliance to be able to improve the compliance of adolescents.

MATERIAL AND METHODS

The research methods and material used here have been described in detail in an earlier paper by Kyngäs⁴.

Sample

Altogether 300 individuals aged 13–17 years were randomly selected from the Finnish Social Insurance Institution's register. Every fifth person on the list was included in the sample. Seventy-seven per cent ($N = 232$) of the selected adolescents with epilepsy returned the questionnaire⁴.

Data collection

The data were collected by using a questionnaire, which consisted of 58 items on the following topics: compliance with health regimens, sense of

normality, support from nurses, physicians, friends, and parents, energy and willpower, motivation, impact of care and treatment, attitude, fear of complications, fear of seizures, and subjective outcomes. Twelve questions pertained to the background variables. The questionnaire was formatted using five-point Likert scales from definite agreement through indecision to definite disagreement. The following items are an example of the items that measure compliance: 'I carry out my medical treatment according to the instructions given by my doctor or nurse', 'I do not carry out the medical treatment as instructed because the medicine causes side-effects', 'I write down the information of my epileptic seizures according to the instructions given by my doctor or nurse', 'I take responsibility for my own care', 'I follow regularly the life-style recommended to me', 'I visit my doctor or nurse regularly according to the instructions and the doctor cooperates with me to plan my treatment to suit my life situation'. The following items are an example of items which measure sense of normality: 'Taking care of my epilepsy according to the instructions is a natural part of my daily routine', 'prevents me from living a normal life like others', 'limits my everyday life, or limits my independence'. Collaboration with parents was elicited by the following items: 'accept the way I care for myself and support me in it', 'are genuinely interested in me', 'remind me to carry out my treatment and motivate me to take care of myself'.

The questionnaires were sent to the adolescents selected from the Social Insurance Institution's register, and the subjects returned them directly to the researcher. Only 47% ($N = 140$) of the subjects returned the questionnaire after the first request, while 77% ($N = 232$) did so after the second request⁴.

The reliability and validity of the study have been discussed in another paper by Kyngäs⁴. Cronbach's alpha was 0.94, which shows the good reliability of the instrument. The content validity of the present questionnaire was confirmed by adolescents with epilepsy and clinical practitioners.

Data analysis

The data were analysed using the Statistical Package for the Social Sciences (SPSS) software (version 8.0). The factors that predicted the compliance of adolescents with epilepsy were studied using logistic regression, which is a procedure that approximates how much more likely (or unlikely) it is for the outcome to be present given certain conditions¹⁶.

Sum variables were formed for analytical purposes from the items that measure the dependent variable, i.e. compliance, and the independent variables, i.e. motivation, sense of normality, subjective outcomes,

energy and willpower, support from parents, physicians and nurses, and a positive attitude towards the disease and treatment, no threat to social and emotional well-being, no fears of complications and no fear of seizures. The scores each subject gave to the questions that belonged to each category were summed, and the sum was divided by the number of variables. The sum variables were then categorized into five categories according to the original Likert scale. The distribution of variables was dichotomous, and they were assigned into two categories. Logistic regression requires the distribution of variables to have dichotomous codes^{16,17}. Item scores from 1 to 3 were combined and assigned a value of 0, and item scores from 4 to 5 were combined and assigned a value of 1. The dependent variable (compliance) was coded as 1 = compliance and 0 = no compliance.

There are many methods for selecting variables into a model, such as forward selection, backward elimination, and stepwise variable selection. Backward elimination was used in the present study. At first, all of the independent variables were included in a regression model. Then, each variable with a *P*-value of less than 0.10 was rejected. Each variable was tested to see what would happen if it were the last one entered into the equation.

Subjects

The series comprised 114 females and 118 males of an average age of 14.6 years (SD 1.32). Forty-one per cent of them were 13 to 14 years old, 20% 15 years old, and 39% over 15 years old. Twenty-two per cent had had the condition for less than 3 years but more than 1 year, 34% for 3 to 6 years, and 44% for over 6 years (mean duration 6.2 years, SD 3.5). Twenty-eight per cent smoked regularly, 22% occasionally, and 50% never. Twenty-four per cent exercised weekly and 15% never. Twenty per cent drank alcohol every week, 46% did not drink, and 34% drank occasionally⁴.

RESULTS

Table 1 shows the factors that predict the compliance of adolescents with epilepsy. There are statistically important values. The odds ratio [OR or $\text{Exp}(B)$] is the most important value of the logistic regression model. The odds ratio is defined as the probability of occurrence over the probability of non-occurrence. The odds ratio indicates how much the probability of compliance changes when there is one unit of change in the independent variable with the other independent variables being held constant^{16,17}. The odds ratio

is compared to the value 1¹⁶. The 95% confidence interval (CI) means that approximately 95% of such varying random CIs, if constructed, would include the population parameter, and 5% would not¹⁶. The narrower 95% CI is the less uncertainty there is in that parameter. Value *B* indicates the weight of each independent variable, and the constant for this number of predictions can be made concerning the outcome¹⁶. The Wald test, the significance, and the degrees of freedom values communicate the significance or insignificance of each independent variable¹⁶.

Support from physician and parents, motivation and no threat to social well-being are the statistically significant factors that predict compliance with health regimens. The most powerful predictor was support from the physician. The likelihood of adolescents supported by their physicians to comply with health regimens was 10.56-fold compared to the adolescents who did not receive support from their physicians. The next powerful predictor was support from parents. The adolescents who received support from their parents complied with health regimens with a 10.47-fold likelihood compared to the adolescents who did not receive support from their parents. Also, those with motivation were 9.77 times more likely to comply than adolescents who did not have motivation. Adolescents who did not feel epilepsy to be a threat to their social well-being were 8.38 time more likely to show good compliance with health regimens than adolescents who felt epilepsy to be a threat to their well-being. (Table 1)

The power of the model's prediction is evaluated by cross-tabulation of the groups predicted by logistic regression and the observed groups. The logistic regression model is the better the fewer false predictions there are. The value of the -2Log likelihood (-2LL), the goodness of fit index and the value of Nagelkerke indicate how good the logistic regression model is and how well it matches the data. The value of the -2Log likelihood is 64.680 and the goodness of fit index is 214.735. The value of Nagelkerke is 0.893, which indicates that the logistic regression model explains 89% of the variance. The model predicts correctly 97% of adolescents with good compliance.

DISCUSSION

The treatment of chronically ill adolescents is a challenge for health care staff¹⁸⁻²⁰. Based on present findings, the most powerful predictor of good compliance is support from the physician. The earlier studies^{4,20} have also indicated that compliance is affected by the quality of the interaction between the patient and the person in charge of the treatment^{4,20}. Effective mental and informational support improved

Table 1: Factors that predict compliance.

Variables	Odds ratio = OR	95% confidence interval (lower/upper)	<i>B</i>	S.E	Wald	df	Sig	<i>R</i>
Support from physician								
• receives support	10.56	(2.06/15.22)	2.32	0.78	8.74	1	0.0031	0.14
• no support	1							
Support from parents								
• receives support	10.47	(2.19/14.77)	2.34	0.82	8.01	1	0.0046	0.13
• no support	1							
Motivation								
• has motivation	9.77	(2.47/13.86)	2.28	0.70	10.56	1	0.0012	0.16
• no motivation	1							
Threat to social well-being								
• no threat	8.38	(1.68/14.14)	2.12	0.81	6.8	1	0.0090	0.12
• has threat	1							

compliance. It has been considered problematic that adolescents do not tell nurses and physicians the truth about their self-care, because their experience is that nurses and physicians are unable to understand their problems^{21–24}. This causes problems in the relationship between adolescents and health care providers: it is impossible to evaluate the needs of adolescents with epilepsy when the relationship is not based on a truthful representation of the adolescents' life. One barrier to telling the truth has been said to be the fact that adolescents try to avoid getting negative feedback by saying that they have good compliance even when that is not true^{24,25}. Another reason can be that adolescents feel that nurses and physicians are not familiar with the adolescents' way of thinking and doing things. For this reason, their opinions concerning, for example, the need for support are different^{21,23}.

There has been less research on the quality of the good relationships that promote the compliance of adolescents. Some studies^{10,14} stress the importance of enabling patients to see their doctors regularly and to talk about their epilepsy and life with them. In the present study, the sum variable 'physician's support' included the following four variables: (1) physicians pay attention to my life situation and problems when planning my treatment, (2) physicians are only interested in my epilepsy rather than me, (3) physicians order how I should act, and (4) physicians encourage me to take care of myself. Based on this, the important aspect of support seems to be that physicians pay attention to each adolescent's life situation. They should be interested in the adolescents as people rather than order how they should take care of themselves. They should encourage adolescents to take care of themselves.

No threat to social well-being also predicts the compliance of adolescents with epilepsy. It has been argued that the compliance of adolescents may

be impaired by a feeling of not being like their friends^{25–27}. The emotional support from friends is largely oriented toward helping the adolescent to feel accepted. Many chronically ill adolescents feel different from, and socially more restricted than, their age peers^{26,27}. Also, cross-cultural studies of epileptic patients emphasize psychological and social problems. However, patients reported feelings of stigma connected with poor compliance¹⁴. In the present study, the absence of threat to social well-being predicted good compliance.

The present findings are generally consistent with the previous reports of the favourable influence of motivation^{4,20}. Motivation is a state of mind that is aroused in response to a situation that is meaningful to the individual²⁸. It would be very interesting to know the factors that improve the motivation of adolescents with epilepsy to attend to their own treatment. If we knew the motivational factors, we could support adolescents towards developing a better motivation, which would help them to achieve greater compliance. As Deci and Ryan²⁸ point out, there is a close relationship between perceived competence and intrinsic motivation. For example, the more competent a person perceives himself or herself to be at some activity, the more intrinsically motivated he or she will be to perform that activity. Adolescents with epilepsy with good compliance may experience a feeling of competence in this matter, and this will increase their motivation. In addition, the maintenance of an intrinsic motivation for some activity requires that the subjects should take responsibility for that activity and have an intention to pursue it²⁸.

CONCLUSIONS

The predictors of good compliance of adolescents with epilepsy are support from the physician and the par-

ents, motivation and feeling no threat to social well-being. These factors predicted correctly 97% of good compliance. These values indicate that the logistic regression model is good and matches the data well.

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