Community care in child psychiatry

An empirical approach using the concept of travel time

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Summary. Community care is a crucial element in the organization and development of psychiatric services. The basic idea of community care is that it guarantees equal access to services for all people in need. In this study an empirical approach to community care is undertaken using the concept of travel time. The importance of distance to the use or nonuse of mental health services has been documented for a long time. But if distance is measured by travel time, additional elements, as for example the available transport system are considered relevant for the accessibility of services. It can be shown that most patients of two child psychiatric outpatient services do not accept a travel time exceeding half an hour. Outreach activities of services located in rural areas can partly compensate for the geographic disadvantage of those patients living at long distance to the service.

For decades in this century psychiatric care in the Federal Republic of Germany was – as in most comparable industrialized countries – dominated by hospitals in the countryside far away from the communities they took responsibility for. But the importance of distance to the use or nonuse of mental health services has been documented for a long time. The inverse relation between the distance from patients' homes to services and the use of the respective services became known in literature as "Jarvis' law", named after the scientist who described this phenomenon first in 1852 (Shannon et al. 1986). Since then numerous studies have been conducted showing the inverse relation between admission rates to psychiatric hospitals and the distance to these hospitals (for example Breaky and Kaminsky 1982; Person 1962; Stern 1977; Weiss et al. 1967; Weyerer and Dilling 1978). The same association can be found with respect to the utilization of outpatient services (for example Breaky and Kaminsky 1982; Häfner-Ranabauer and Günzler 1984; Vaslamatzes et al. 1987).

However, in most studies only distance is considered, rather than travel time or availability of transport, although this has been recommended by the American Hospital Association and the U.S. Public Health Service for use in analysis of patient travel (U.S. Public Health Service 1961). Besides Blumberg (1965), who used approximate highway travel time as a measure of distance, only Breaky and Kaminsky (1982) demonstrated that a regular bus service can reduce the influence of distance on the acceptance of services.

Furthermore there are few studies dealing with this issue with respect to certain patient groups. For example in child psychiatry the only study known to us is one by Walter et al. (1988). These authors also found an association between residential distance from and admission to a hospital. However, the influence of distance on the utilization of outpatient services is not analysed in this study. The authors only mention, that in areas well equipped with outpatient services the utilization rate is higher than in less well equipped areas.

With the reported findings in mind it is clearly understandable that a crucial element of all psychiatric reforms has been the implementation of psychiatric services in the community. An expert commission, appointed by the Federal Government of West-Germany in 1975, tried to operationalize the term "community care". According to their definition, a psychiatric service can be regarded as community based if its catchment area does not exceed a geographic radius of 25 kilometers or if it can be reached by public transport within one hour. The commission also pointed out that one has to consider the characteristics of urban and rural catchment areas in the organization of community based services (Deutscher Bundestag 1975). This reference to particularities of urban and rural areas implies that utilization is not only related to distance but also to other intervening factors, as for example the quality of public transport. Moreover, socioeconomic status, family status or disease related variables are also supposed to interfere with the utilization of psychiatric facilities.

These and other factors lead to an extended view of the organizational structure of community based services. Beyond the rigid geographical determination of a catchment area, community based care requires a flexible adjustment to the needs of special patient groups, whose

utilization is impeded for different reasons. For these patients outreach activities, for example, might be an essential contribution to make care more flexible.

In this study we wanted to examine empirically the criteria identified by the expert commission by analyzing the utilization data of two child psychiatric outpatient services. As the two populations studied are comparable regarding social and disease related characteristics (see below) the decisive factor in our analysis is the location of the two services respectively in an urban and in a rural area: One of them is in the city of Mannheim, well equipped with public transport, the other in the Rhein-Neckar District, a rural area with insufficient public transport.

The following questions will be investigated:

1. What length of travel time is acceptable to patients?
2. Which means of transport are preferred within the regional transport system?
3. What is the influence of the family situation of single parents on utilization?
4. What is the influence of outreach activities of these services on utilization?

Population studied and methodology

Psychiatric care for mentally ill children and adolescents in the Federal Republic of Germany has been strongly criticized by the mentioned expert commission in 1975. At that time child and adolescent psychiatry was characterized by hospitals with large catchment areas on the one hand and an insufficient system of outpatient services on the other hand. There only existed a network of educational services, unconnected with the few available child psychiatric facilities. Since then psychiatric care for mentally ill children and adolescents has improved in a few areas of the Federal Republic mainly be implementing model services. As part of a model program initiated by the Federal state of Baden-Württemberg[1] psychiatric care for mentally ill children and adolescents in the Rhein-Neckar District was supplemented by two outpatient services in 1983 and 1984 (Rössler et al. 1985). These two newly established outpatient services are analysed in our study. One of them is operated by a child psychiatrist, whose office is integrated into the main office of the local educational service in Mannheim. The catchment area of this "urban service" covers the whole area of Mannheim, a city of 300.000 inhabitants. In the second model service works one child psychiatrist and one social worker. This service is located in the small town of

Schwetzingen (about 18.000 inhabitants) in one building together with an educational service. The catchment area of this "rural service" comprises the Rhein-Neckar District, a district with about 600.000 inhabitants, distributed over about 150 small towns and villages. The central task of both services is the early diagnosis of mental diseases and disorders as well as the aftercare for mentally ill children and adolescents discharged from inpatient treatment.

An evaluation of the period 1.1. 1984 until 30.6. 1986 showed that in spite of their different geographic location the services serve a similar population regarding socio-demographic and disease-related characteristics (Rössler et al. 1987). Some of the crucial characteristics should be mentioned at this point: 57.6% of the patients of the urban service and 64.3% of the patients of the rural service belong to lower social classes (classification according to Kleining and Moore (1968), using the occupation of the father or the occupation of the mother if she brings up the child on her own). Regarding the age distribution, in Mannheim 48.7% and in Schwetzingen 53.3% of the patients belong to the age group 6 to 14 years, 33.7% and respectively 37.0% to the age group 15 to 18 years. According to the multiaxial classification by Rutter, Shaffer and Sturge (Remschmidt and Schmidt 1977) the distribution of psychiatric diagnoses is also very similar: disturbances of social behaviour are the most frequent ones on the first axis representing 45.9% and 43.6% respectively. Introversive disorders amount to 32.1% in the urban and to 30.7% in the rural service. On the fifth axis abnormal psychosocial conditions within the family were diagnosed in 89.9% and 91.0% of the cases.

The following analysis is based on utilization data from 1984 and 1985. During this period in the urban service 216, and in the rural service 153 patients were cared for. For statistical analysis the variables "travel time", "type of utilization" and "family situation" were chosen. The travel time required was documented in minutes according to the information given by the patients. Previous analyses (Rössler et al. 1988) made it reasonable to dichotomize travel time at a threshold of 30 minutes. The "type of utilization" on the one hand refers to the chosen means of transport. Very few patients walked to the service – they were included in the category "public transport". Besides there was a category "own car". In the following step of the statistical analysis these two categories were combined into the category "come-structure" in contrast to the category "go-structure", which refers to outreach activities of the services, i.e. visits to the patients' home. The third variable, "family situation", tells whether the patient belongs to a complete or an incomplete, i.e. single parent, family. This variable is highly confounded. It was chosen on the assumption that utilization is probably more difficult in incomplete families, as single parents often have to cope with a job as well as child rearing and often do not have access to a car.

The overall availability and quality of public transport in each catchment area was investigated. Travel time was calculated by the time tables of railway, buses and tram lines. Only travel time without waiting time or time needed for changing lines was considered.

The statistical analysis starts with a univariate comparison between the two services, using χ^2 in nominal scaled data. In order to examine the assumed relation between the chosen variables log-linear models suitable for nominal scaled data were tested in a further step (Langeheine 1980a, b). By using Likelihood-Ratio-χ^2 statistics and their P-values, different models can be tested. The highest P-value achievable is 1.0, if the model corresponds totally with the empirical data.

For the statistical analyses the program packages BMDP-3F (Brown 1983) and SPSS-X (Schubö and Uehlingen 1986) were used.

Results

Figure 1 shows the catchment areas of the urban and rural services (the area of Heidelberg does not belong to the catchment area of the rural service). It becomes evident that according to the operationalization of the expert commission only the urban service could be classified as a community based service: The distance to the furthest community border is 17 kilometers; travel time with public transport within the city borders remains under 1 hour without exception. The rural service, however, does not fulfill these prerequisites, whether using the one-hour- or the 25-km-criterion. (The one-hour radius in Fig.1 does not coincide with the exact values gained by the above mentioned calculations based on time tables, but represents a simplification for illustration).

Table 1 shows that in the rural area only 27.5% and in the urban area only 13.4% of the patients require a travel time exceeding 30 minutes. With respect to the urban service this partly was to be expected, as the density of population is much higher in the inner city than in the suburbs. It is also known that there is often a higher proportion of persons with mental disorders near the center of a city (Faris and Dunham 1939), where the analysed urban service also is located. In the catchment area of the rural service, however, the area outside the 30-minute-radius is several times bigger than the area inside. As the whole Rhein-Neckar District shows a very evenly distributed density of population (Statistisches Landesamt 1987), a larger proportion of the population lives outside the 30-minute-radius. Furthermore there are no good reasons for the assumption that persons with mental disorders concentrate around the rural service. This means that in the rural service patients with a longer travel time are clearly underrepresented. Even if travel time does not exceed half an hour, the parents of patients in the rural service more often have to use their car and more frequently rely on home visits than those in the urban service. The difference in the proportion of incomplete families cared for the two services in, however, is not statistically significant.

Table 2 shows the relation between "type of utilization" and "travel time". The time for visiting patients at home ("go-structure") is compared with the travel time of patients coming to a service ("come-structure"), the latter differentiated according to the kind of transport as

Table 1. Comparison of two child psychiatric services concerning different characteristics relevant for utilization

Characteristic service		Child-psychiatric service Mannheim (urban)		Child psychiatric service Schwetzingen (rural)	
		n	%	n	%
Total number of clients		216	(58.5)	153	(41.5)
Travel time	< 30 min	187	(86.6)	111	(72.5)
	> 30 min	29	(13.4)	42	(27.5)
		Chi^2 1 DF $P < 0.001$			
Type of utilization	Public transport	139	(64.7)	42	(27.5)
	Own car	59	(27.4)	51	(33.3)
	Home visit	17	(7.9)	60	(39.2)
		Chi^2 2 DF $P < 0.001$			
Family situation	Complete family	141	(65.3)	105	(68.7)
	Incomplete family	75	(34.7)	48	(31.3)
		Chi^2 1 DF n.s.			

well. In the urban service travel time is not relevant to the decision to visit the patient at home. In the rural service on the contrary there is a highly significant association between travel time and outreach activities: About $^2/_3$ of those patients whose travel time is longer than 30 minutes are visited at home. In a further step the relation between increasing distance and probability of home visits was investigated. For this purpose the catchment area was divided into four geographical areas. Figure 2 shows that a home visit becomes more probable, the further a patient lives from the rural service (χ^2 $(P) \leq 0.0001$).

Table 3 shows the association between "family situation" and "come-structure/go-structure" respectively. There is no statistically significant relation except one: Patients who come to the urban service by car belong to complete families significantly more often, whereas patients
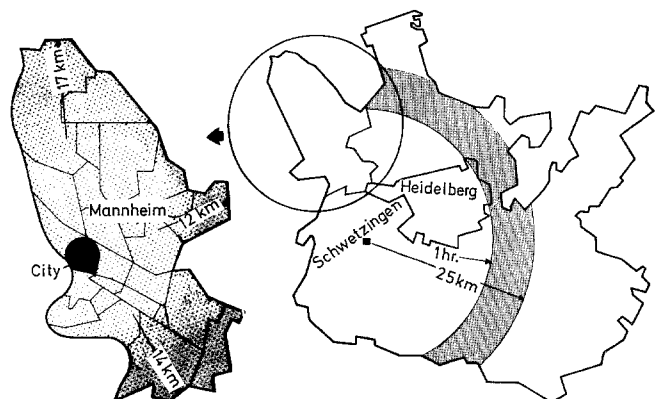

Fig.1. The criteria of the expert commission for defining "community-based care" – demonstrated by the catchment area of two child-psychiatric services; □ – 30 min; ▨ 30–60 min

Table 2. Type of utilization by travel time

Type of utilization	Child psychiatric service Mannheim (urban)			Child-psychiatric service Schwetzingen (rural)		
	"Come-structure"		"Go-structure"	"Come-structure"		"Go-structure"
Time						
< 30 min	171 (91.9)		15 (8.1)	79 (71.2)		32 (28.8)
> 30 min	27 (93.1)		2 (6.9)	14 (33.3)		28 (66.7)
	Chi² 1 DF n.s.			Chi² 1 DF $P < 0.001$		
	Public transport	Own car	Home visit	Public transport	Own car	Home visits
< 30 min	116 (62.4)	55 (29.6)	15 (8.1)	37 (33.3)	42 (37.8)	32 (28.8)
> 30 min	23 (79.3)	4 (13.8)	2 (6.9)	5 (11.9)	9 (21.4)	28 (66.7)
	Chi² 2 DF $P < 0.1$			Chi² 2 DF $P < 0.001$		
< 30 min	116 (67.8)	55 (32.2)		37 (46.8)	42 (53.2)	
> 30 min	23 (85.2)	4 (14.8)		5 (35.7)	9 (64.3)	
	Chi² 1 DF $P < 0.1$			Chi² 1 DF n.s.		

Table 3. Type of utilization by family situation

Type of utilization	Child psychiatric service Mannheim (urban)			Child-psychiatric service Schwetzingen (rural)		
	"Come-structure"		"Go-structure"	"Come-structure"		"Go-structure"
Family situation						
Complete family	129 (91.5)		12 (8.5)	69 (65.7)		36 (34.3)
Incomplete family	69 (93.2)		5 (6.8)	24 (50.0)		24 (50.0)
	Chi² 1 DF n.s.			Chi² 1 DF $P < 0.1$		
	Public transport	Own car	Home visit	Public transport	Own car	Home visits
Complete family	84 (59.5)	45 (31.9)	12 (8.5)	30 (28.6)	39 (37.1)	36 (34.3)
Incomplete family	55 (74.3)	14 (18.9)	5 (6.8)	12 (25.0)	12 (25.0)	24 (50.0)
	Chi² 2 DF $P < 0.1$			Chi² 2 DF $P < 0.1$		
Complete family	84 (65.1)	45 (34.9)		30 (43.5)	39 (56.5)	
Incomplete family	55 (79.7)	14 (20.2)		12 (50.0)	12 (50.0)	
	Chi² 1 DF $P < 0.05$			Chi² 1 DF n.s.		

from incomplete families more frequently have to rely on public transport.

Finally a log-linear analysis including all variables mentioned so far was calculated for the total group of patients. Model 1 shows a triple interaction between the type of service (urban/rural), the travel time and the means of transport: As expected the characteristics of a urban or rural catchment area influence travel time as well as the type of transport. The double interaction between family situation and transport in model 1 shows that available means of transport seem to depend on the family situation. In model 2 the variable "means of transport" is substituted by the dichotomized variable "come/go", i.e. whether the patient uses the service versus outreach activities of the service. This model also shows a triple interaction. The decision whether the patients come to the service or are visited at home again depends on the type of service and on the travel time to the service. The decision whether the patient is visited at home or not is also influenced by the family situation. Model 3 which abandons the double interaction between "family situation" and "come/go" shows a very similar p-value in comparison to model 2 thus indicating a relatively low explanatory value of this interaction. Model 4 shows the best fit with the empirical data. Here, in contrast to model 2 and 3 the means
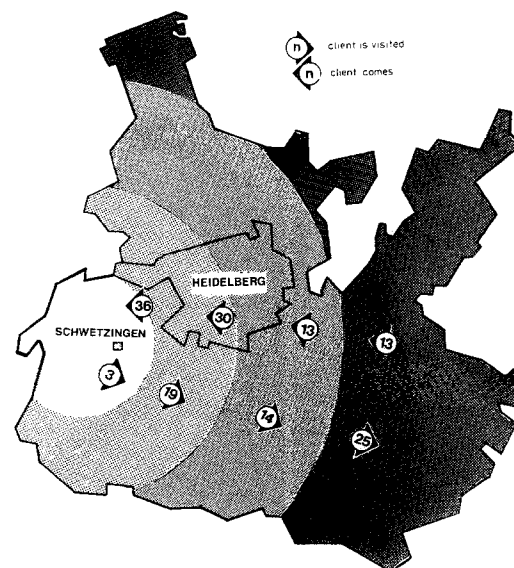
Fig. 2. "Come-" and "go-structure" in the rural child-psychiatric service – catchment area divided into 4 geographic regions

Log-linear analyis	LR Chi²	P	DF
MODEL 1 — Time, Service, Family situation, Transport	3.93	0.6861	6
MODEL 2 — Time, Service, Family situation, Come/go	3.97	0.6811	6
MODEL 3 — Time, Service, Family situation, Come/go	5.00	0.6598	7
MODEL 4 — Time, Service, Family situation, Transport go	4.99	0.8353	9

Fig. 3. Log-linear model analysis concerning the relation of different determinants of utilization of child-psychiatric outpatient services

of transport for patients coming to the service were incorporated in the model. This means that all variables were taken into consideration in this model. The described interactions therefore have the highest explanatory value when means of transport as well as outreach activities are taken into account for analysis.

Discussion

Summing up it can be stated that outreach activities of the rural service can at least partly compensate for its geographic disadvantage. This especially applies for those patients with a long travel time who rely on public transport. Family situation influences the kind of utilization, i.e. incomplete families more often have to rely on public trans-

port or home visits. In the case of outpatient care for mentally ill children and adolescents it therefore becomes evident that the help offered must be adjusted to the conditions of families, i.e. outreach activities are essential in community based care. Outreach activities also allow the adaptation of community care to the characteristics of rural and urban regions. A rigid determination of a catchment area would not be appropriate for meeting a wide variety of patient needs.

Furthermore we were able to show that the time burden patients are willing to tolerate lies far below that proposed by the West German expert commission. To our knowledge, no comparable study, analysing the utilization of child psychiatric outpatient services from the perspective of travel time, so far exists. We did find aquivalent results in relation to outpatient services for

chronically mentally ill adults. Thus, for 42% of the patients of nine services analysed by us, travel time was less than 50 minutes, and for a further 39% less than half an hour (Rössler et al. 1988). Moreover there are other findings indicating that in a dense network of psychiatric outpatient services the utilization rate of a defined schizophrenic population increases to more than 90%, although this target population is regarded as a low compliance group (Häfner and an der Heiden 1983; Häfner et al. 1986). This also indicates the outstanding importance of travel time.

Certainly there may be other factors modifying the utilization of a service including the referral source or the seriousness of the health problem. Nevertheless, it is increasingly realized that convenience factors such as travel time play a central role in the individual's decision to utilize a available service, regardless of other factors (Acton 1975; Miners et al. 1975).

Distance does seem to be a variable that should be considered in the organization of services in addition to other variables of possible interest such as the patients' economic status or degree of disability. The information gained by this study can be regarded as a refinement of the available knowledge about the influence of distance on the utilization of services.

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