

ORIGINAL PAPER

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Need and demand in psychiatric emergency service utilization: explaining topographic differences of a utilization sample in Mannheim

Received: 21 July 1999 / Accepted: 31 May 2000

Abstract Up to now all investigations about the topographic distribution of psychiatric utilization rates ignore whether or not the patients really require care (need for care) respectively express that need by themselves (demand for care).

To analyze utilization rates of the psychiatric emergency service of the Central Institute of Mental Health in Mannheim (CIMH), variables differentiating between need and demand for emergency care were included. The investigation is based on contacts in the psychiatric emergency service between 1982 and 1993 and comprises 6463 patients with 14,628 contacts. To operationalize the concepts of need and demand the items “instance of consultation”, “reasons for consultation”, “inpatient admission” and “rated urgency” from the standardized record system of the psychiatric emergency service were used. The association between need, demand and ecological, socio-demographic and distance-related factors were analyzed.

The results show that demand for psychiatric emergency care is an important factor for explaining topographic differences in service utilization. *Demand* correlates with ecological, socio-demographic and distance related factors; *need* only correlates with age. The amount of demand also varies with specific mental disorders.

Key words Service utilization · Psychiatric emergency service · Need · Urban ecology · Distance

Introduction

To explain topographic differences in psychiatric service utilization, area characteristics as well as population-based

socio-demographic indicators and characteristics of patients were investigated. Ecological factors concerning characteristics of districts or residential areas were first used by Faris and Dunham [6], followed by a lot of related studies [13, 17, 27]. Complementary to ecological variables like density of population or standards of living, the accessibility of the service [2, 15, 16, 22] and the influence of socio-demographic characteristics on service utilization [8, 14, 21, 25] were applied to explain topographic differences of utilization rates. Most ecological studies on psychiatric service utilization are based on the analysis of first or overall admission rates of regular in- and out-patient services in urban areas [6, 8, 17, 27].

Up to now there are no studies on the topographic distribution of psychiatric service utilization considering whether the patients from different areas actually require care (“objective need”) and/or express the need (“subjective demand”) for it by themselves. In the literature varying definitions of need and demand can be found [3, 4, 28]. Bradshaw [1] distinguishes between patient-assessed and provider-assessed needs. With regard to patient-assessed needs (demand) Bradshaw differentiates between *felt* and *expressed need*. Provider-assessed needs – as externally defined needs – were subdivided into *normative* and *comparative needs*.

In this paper, we use “need” in the sense of Bradshaw’s concept of *normative need* and “demand” in the sense of his concept of *expressed need*.

This distinction seems to be necessary when analyzing utilization rates because need must not necessarily be accompanied by demand, and there can be demand without any need for a specific service [28]. Therefore in looking for the causes of service utilization it should be decided whether patients came for *objective need* and/or *subjective demand*. The distinction between need and demand for a treatment in the psychiatric emergency service seems to be especially important for its utilization, because the necessity of its consultation – similar to the consultation of out-patient facilities – is frequently decided by patients alone.

Studies on the psychiatric emergency service in Mannheim [5, 11] confirmed the former results about the

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topographic distribution of psychiatric service utilization in Mannheim [13, 26, 27]. Utilization rates of the psychiatric emergency service in Mannheim concentrically decrease from the city center to the outskirts. Additionally the rates were higher in areas with less favorable than with favorable ecological conditions and increased with the accessibility of the service becoming better [5].

Former studies on distance between residence and service location have shown that for regular psychiatric in- and outpatient services, better accessibility leads to increased service utilization [2, 16, 24]. This may mean that better accessibility of a service raises the individual's inclination or his/her demand for contacting the service. Therefore we presumed that the accessibility of a psychiatric emergency service facilitates the interaction between patient and institution and by this the patient's demand for service utilization. Since we found that the influence of the accessibility-factor on utilization rates increases over time [5], we expected that demand becomes more important for repeated contacts.

The present study examined whether the distinction between objective need and subjective demand for a contact in the emergency service can explain topographic differences in the utilization rates of the psychiatric emergency service in Mannheim. The following questions were examined:

- Do the proportions of patients with "need" and/or "demand" for service utilization differ between the districts of Mannheim?
- Can topographic differences in the utilization of the emergency service be explained by objective need and/or subjective demand?
- Does a relation exist between ecological, socio-demographic and/or distance-related factors and indicators for "need" and "demand" in regard to the area-related service utilization of the psychiatric emergency service?
- Is the influence of "need" and/or "demand" on service utilization dependent on specific mental disorders?

Method

In Mannheim a well-structured system of comprehensive community mental health care [12] exists which had been developed in the course of the founding of the Central Institute of Mental Health in Mannheim (CIMH) in the 1970s. Like all other psychiatric facilities of the institute, the emergency service is located in the city center and can be contacted anytime without having an appointment. Due to functional requirements, the emergency service of the CIMH is located at two places in the city a) at the CIMH and b) at the main general hospital of the city. At both locations the services are subdivided into a service *within office hours* and a service *out of office hours*.

As the emergency service of the CIMH only provides care for *all* psychiatric emergency cases in Mannheim out of office hours and does not share this function with privately practicing psychiatrists and other general hospitals, this study includes only contacts out of office hours. Thus it was possible to exclude those area-related differences in service utilization caused by general practitioners or particularly by privately practicing psychiatrists.

The city of Mannheim

Mannheim is an industrial city and a university town, situated in the north of Baden-Württemberg at the entry of the Neckar river into the Rhine river. It is officially subdivided into 23 districts which are significantly different with regard to size and number of inhabitants. In the observation period (1982–1993) the mean number of inhabitants was 311 000.

Sample

The analysis of psychiatric service utilization out of office hours is based on data from the standardized record system of the psychiatric emergency service in the CIMH of Mannheim between 1982–1993.

In this period 6463 patients from Mannheim accounted for 14 628 contacts. For the 23 districts of Mannheim both first contact rates (number of first contacts / number of inhabitants x 10,000) and contact rates (number of contacts / number of inhabitants x 10,000) were calculated on the basis of annual data of the population of Mannheim for each year. In order to gain reliable rates also for those districts with a relatively small number of inhabitants, all first contact and contact rates were calculated for two-year intervals.

Measures

The operationalization of the concepts *need* and *demand* was carried out on the basis of items from the standardized record system of the emergency service. To define *need* for a psychiatric emergency service, the items: "assessed urgency for consulting the emergency service", "reason for contacting the service" and "recommended further treatment" were used. The presence of *need* was accepted, if: a) the psychiatrist rated a high urgency for the consultation on a three-point rating scale (low, medium, high urgency) and one of the following reasons for contacting the service were present: drugs, alcohol, mental illness, physical illness, suicide attempt or risk of suicide, or b) an inpatient treatment was recommended. The applied operationalization for *demand* is based on the item "initiator of the consultation". The presence of a patient's demand was accepted if the patient had expressed demand for care by initiating the contact with the emergency service by himself/herself.

We had to choose this kind of operationalization because established instruments for the assessment of need [4, 18, 25] would have been too extensive for their routine application within the standardized record system of the investigated psychiatric emergency service.

Socio-demographic characteristics of the districts could only be calculated on the basis of the patients coming from the different districts to the emergency service. Age, gender, marital status (proportion of unmarried patients), living conditions (proportion of patients living alone), employment (proportion of employed patients) and occupational position were included. Unfortunately there were no precise population data of the different districts available.

As area-related variables, the proportion of foreigners, density of population and a zonal distribution of the districts were included. The zonal subdivision of districts is founded on sociological theories on urban development [20], which stated that living conditions and socio-economic status of residents tended to ameliorate from the city toward the outskirts.

To measure the accessibility of the service the average driving time by public transports was taken into account.

To investigate the influence of the types of mental disorders seven diagnostic groups were formed based on the ICD-9 codes: 1) organic and symptomatic mental disorders [290.*, 293.*, 294.*, 310.*], 2) psychoactive substance use disorder [291.*, 292.*, 303.*, 304.*, 305.*], 3) schizophrenia [295.*, 297.*, 298.], 4) affective disorders [296.*, 298.0, 300.4], 5) neurotic disorders / disorders of personality or behavior [300, 300.1–300.3, 300.5–300.9, 301.*, 302.*, 306.*, 307.*, 311, 312.*, 313], 6) psychogenic reactions [308.*, 309.*] and 7) other nonpsychotic disorders [315.*, 317–319].

Results

First contact rates of the emergency service in Mannheim varied over the 23 districts between 7–26/10000 inhabitants, contact rates between 12–80/10000. The distribution pattern of first contact rates of Mannheim is similar to that of contact rates ($r = 0.94$, $N=138$, $p < 0.0001$). With a few deviations, the pattern is characterized by a concentric decreasing utilization from the city center to the outskirts.

In the utilization sample, 69% of the 6463 patients at their first contact had *need* for an emergency service consultation and 20.7% of all patients showed *demand* for emergency care. With regard to the total number of all contacts ($N=14628$), the percentage of need decreases slightly to 66.1% and the percentage of demand increases to 36.2%.

The combination of the concepts *need* and *demand* results in four categories: 1) patients who need consultation but show no demand for it, 2) patients who show demand for an emergency service but do not need contact with the service, 3) patients with need and demand for an emergency service and 4) patients which do not fulfill any of these 3 criteria. The bar graph in Fig. 1 shows the distribution of the percentages of first contacts and all contacts in the emergency service with regard to *need* and *demand*. About half of the contacts (48.2%) were characterized by need without demand, 18.3% only by demand and in 17.9% of the contacts both need and demand were fulfilled. With regard to the course of patient careers, changes in the distribution of need and demand were described by the ratio of all contacts to first contacts. The ratio indicates more demand in all contacts than in first contacts ($36.2/20.7 = 1.7$). It is particularly the percentage of contacts only characterized by demand which is nearly double ($18.3/9.8 = 1.9$).

Of the first contacts 21.2% and of all contacts 15.6% did not meet any of the above criteria for need and demand. Of all contacts without need nor demand 64% were mostly arranged by the general hospital, general practitioners and the emergency service of the city, 28% by relatives or friends and 8% by the police.

To investigate the topographic distribution of utilization rates of the psychiatric emergency service with regard to need and demand, first contacts and all contacts between 1982 and 1993 were analyzed. The topographic distribution of the average percentage of contacts with *need* is similar for first contacts and all contacts ($r=.74$, $N=138$, $p=0.001$). Figure 2 therefore only presents the map of the average percentage of need for all contacts.

The average percentages of need varied slightly among the districts of Mannheim (range: 60% – 78%); 21 of 23 districts vary within a small range of 60% to 70%.

The percentage of patients with demand varied over the 23 districts of Mannheim in first contacts between 13% and 34%, in all contacts between 20% and 52%. With regard to the percentages of demand in the 23 districts, there is also a positive correlation between first contacts and all contacts ($r=.44$, $N=138$, $p=0.03$). Figure 3 therefore only presents the average percentage of demand for all contacts.

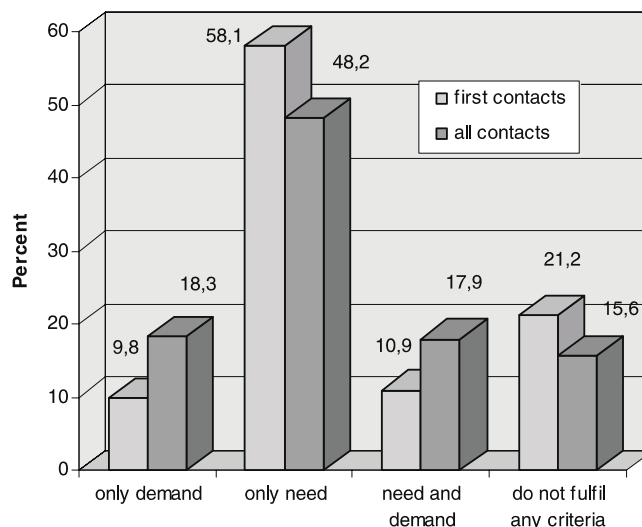


Fig. 1 Percentage of *need* and *demand* in the psychiatric emergency service of the CIMH in the 23 districts of Mannheim (Observation period 1982–1993).

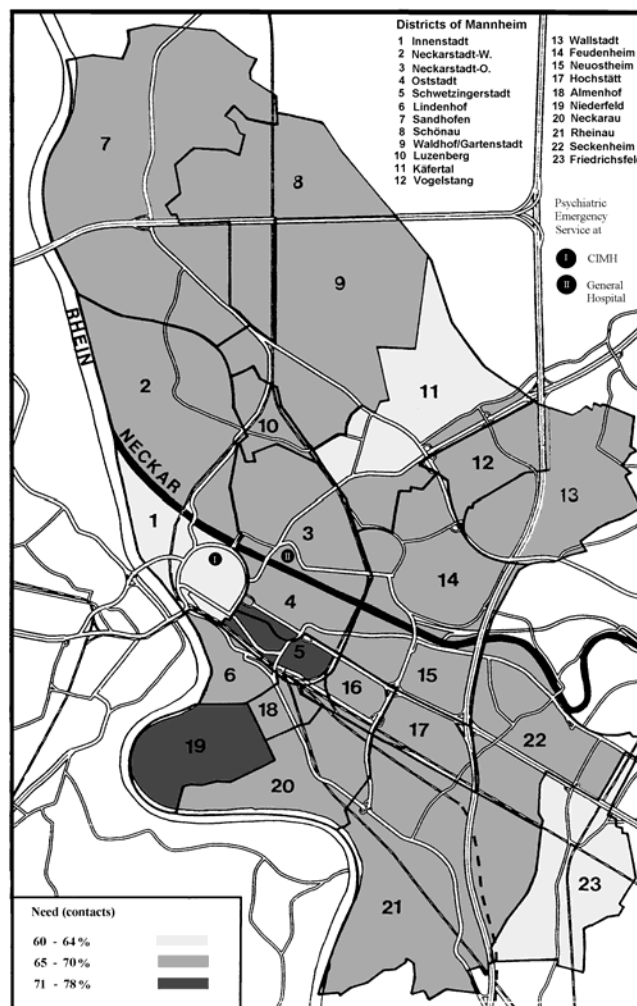


Fig. 2 Topographic distribution of the average percentage of *need* for emergency care for all contacts in the psychiatric emergency service of the CIMH in Mannheim (Observation period 1982–1993)

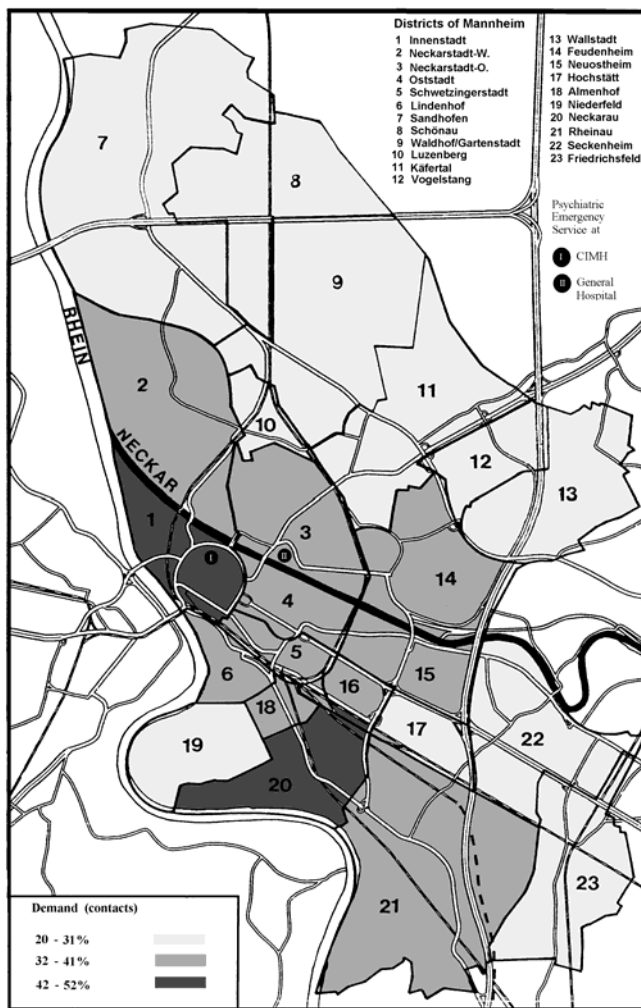


Fig. 3 Topographic distribution of the average percentage of *demand* for emergency care for all contacts in the psychiatric emergency service of the CIMH in Mannheim (Observation period 1982–1993)

A subdivision of the range of all contacts into three equal parts shows 2 districts with a high percentage of demand (42–52 %), 10 with a medium percentage (32–41 %) and 11 with a low percentage (20–31 %). From the city center to the outskirts of Mannheim, a decrease of the percentages of demand can be seen, except for district no. 20.

Need, demand and the accessibility of the emergency service

Generally the percentage of demand decreases with increasing distance between residence and service location. On account of this relation, it may be assumed that the topographic differences of contact rates are mainly a distance-induced phenomenon without any true influence of demand. To test this hypothesis, the accessibility of the service (as average driving time by public transports between residential area and service location) was taken into account to investigate the influence of need and demand on

first contact and contact rates. For the dependent variables *first contact* and *contact rate*, in an analysis of covariance, rates were calculated on the basis of two-year intervals between 1982 and 1993. In addition to the percentage of patients with need and demand, the average age of the patients living in the respective districts, the accessibility of the service and the location of residential and nursing homes in Mannheim were included as covariates. The analysis yields significant main effects for age ($F(1,127)=15.4$, $p<0.001$), accessibility of the service ($F(1,127)=25.7$, $p<0.001$) and the proportion of demand ($F(1,127)=6.7$, $p<0.01$) on the variable first contact rate. Patients from districts with high first contact rates are younger than patients from districts with lower rates and the percentage of demand for contacting the psychiatric emergency service is higher in districts with high rates. Additionally the distance between their residence and the service is shorter.

There are also significant main effects for age ($F(1,133)=21.2$, $p<0.0001$), accessibility ($F(1,133)=29.8$, $p<0.001$) and demand ($F(1,133)=8.9$, $p<0.01$) on contact rate. Additionally a significant interaction was found for accessibility x demand ($F(1,133)=11.2$, $p<0.001$). The influence of demand on contact rate increases with decreasing average driving time by public transportation between residential area and service location. For first contact rate 29 % of the variance could be explained, by age (8.9 %), accessibility of the service (15 %) and demand (4.1 %). For contact rate 42 % of the variance could be explained by the same variables, age (10 %), accessibility of the service (18.7 %), demand (4.2 %), interaction for accessibility x demand (5.3 %).

To analyze the relationship between the proportion of contacts with need on one side and with demand on the other side with other important utilization factors of psychiatric services, the correlations with ecological and socio-demographic characteristics of the 23 districts of Mannheim were investigated (Table 1). Because the Kolmogoroff-Smirnov goodness-of-fit test for need and demand indicates normal-distribution for both variables Pearson-correlation coefficients were calculated.

Table 1 shows the correlations between socio-demographic, distance related and ecological predictors for service utilization and the percentage of contacts with need and with demand.

The two significant correlations between the percentage of contacts with need and age, or employment are mainly based on a high positive association between need and age. The amount of need for an emergency service consultation increases with increasing age and decreasing employment. The negative correlation between need and employment can at least partly be explained by an effect of age.

There are more conspicuous correlations between the proportion of demand and other variables. Demand is not only correlated with the accessibility of the service but also with marital status (percentage of singles), living conditions (percentage of patients living alone) and with most ecological characteristics such as: proportion of foreigners, density of population and the zonal subdivision of the districts.

Table 1 Significant correlations between the percentage of contacts with need and with demand for emergency care and other utilization factors over the 23 districts of Mannheim (Observation period 1982–1993)

Utilization factors		Percentage of contacts with need	Percentage of contacts with demand
<i>Demographic variables of the patients</i>	Age (mean)	.24***	–
	Gender (in %)	–	–
	Marital status (singles in %)	–	.41***
	Living conditions (“living alone” in %)	–	.33***
	Socio economic status (low status in %)	–	–
	Status of employment (employed in %)	–.18**	–
<i>Ecological Variables</i>	Housing conditions	–	–
	Proportion of foreigners	–	.17***
	Density of population	–	.43***
	Zonal model (Nellner [§])	–	.46***
<i>Distance</i>	Accessibility of the service	–	–.28***

[§] The zonal subdivision of districts is founded on sociological theories on urban development, Nellner, 1969.

significance level $p < 0.05$; *significance level $p < 0.01$

A significant correlation could also be found between the percentage of contacts with need and the percentage of contacts with demand ($r = -0.41$, $N=133$, $p < 0.01$). An increasing percentage of demand is associated with a decreasing percentage of need for an emergency service.

Generally demand increases with aggravating ecologi-

cal conditions. Even if the socio-demographic, ecological and distance-related characteristics of the 23 districts are included in a supplementary multi-factorial analysis of covariance, the proportion of *demand* still shows a significant contribution to the explanation ($F(1,133)=5.8$, $p < 0.01$) of topographic differences in service utilization.

Table 2 Distribution of demand for emergency care in districts with high, medium and low contact rates for the 23 districts of Mannheim (Observation period 1982–1993)

Diagnostic groups	Contact rates	Demand for care				χ^2	p
		Yes		No			
		N	%	N	%		
Organic/symptomatic mental disorders	High rate	8	9.1	80	90.9	0.4	0.819
	Medium rate	23	7.4	289	92.6		
	Low rate	32	8.4	347	91.6		
Psychoactive substance use disorders	High rate	497	54.9	409	45.1	242.1	0.001
	Medium rate	406	28.3	1030	71.7		
	Low rate	322	25.1	959	74.1		
Schizophrenia	High rate	488	57.2	365	42.8	48.4	0.001
	Medium rate	553	46.6	634	53.4		
	Low rate	496	41.8	692	58.5		
Affective disorders	High rate	154	55.6	123	44.4	48.9	0.001
	Medium rate	249	40.7	363	59.3		
	Low rate	227	31.7	490	68.3		
Neurotic disorders and disorders of personality and behavior	High rate	220	59.6	149	40.4	19.2	0.001
	Medium rate	411	50.9	397	49.1		
	Low rate	327	45.6	390	54.4		
Psychogenic reactions	High rate	117	30.0	273	70.0	18.0	0.001
	Medium rate	226	20.1	900	79.9		
	Low rate	234	20.8	690	79.2		

Table 3 Distribution of need for emergency care in districts with high, medium and low contact rates for the 23 districts of Mannheim (Observation period 1982–1993)

Diagnostic groups	Contact rates	Need for care				χ^2	p
		Yes		No			
		N	%	N	%		
Schizophrenia	High rate	536	62.8	317	37.2	42.0	0.001
	Medium rate	870	73.3	317	26.7		
	Low rate	896	75.4	292	24.6		

Need, demand and diagnoses

The results of the preceding analysis of covariance have shown a general effect of demand but no effect of need on the contact rates. It has to be asked whether these results should be attributed to specific mental or behavioral disorders. On account of the frequencies being too small, an analysis of covariance for diagnostic groups was impossible. Therefore, the frequency table method was used.

In the observation period, psychoactive substance use disorders are the most frequent diagnoses (25.2 %) in the psychiatric emergency service, followed by schizophrenia (22.8 %), psychogenic reactions (18.5 %), neurotic disorders/disorders of personality and behavior (13.3 %), affective disorders (11.5 %), organic/symptomatic mental disorders (5.5 %) and other non-psychotic disorders (2.3 %). In 0.8 % of the consultations no psychiatric diagnosis was assigned. With the exception of the last group, it was possible to analyze whether the contact rates of patients with specific disorders depend on need and/or demand. Table 2 shows the distribution of demand for all contacts in districts with high, medium and low utilization rates for the six diagnostic groups. The proportion of contacts with demand largely differs between the diagnostic groups. The lowest average proportion of demand was found for organic/symptomatic disorders (8.1 %) and the highest proportion of demand was found for neurotic disorders and disorders of personality and behavior (50.5 %).

With the exception of organic/symptomatic mental disorders, the proportion of demand over the districts of Mannheim highly covaries with the contact rate of each diagnostic group in the same way (Table 2): in districts with a high contact rate the percentage of contacts with demand is higher and in districts with a low rate it is lower than the average value for demand.

Only for schizophrenics did the distribution of need for contact with the emergency service show a significant association with the service utilization (Table 3). For these patients the percentage of contacts with a need for emergency service is lower in districts with a high contact rate than in districts with a medium and low rate.

Discussion

On the basis of data from the patient record system of the CIMH, our results show that for the investigation of psy-

chiatric emergency service utilization the discrimination of need and demand considerably contributes to the explanation of topographic differences in utilization rates. The relatively high number of contacts without need or demand in the investigated sample could be assigned to two different causes: first to the consultation-liaison function of the psychiatric emergency service in the general hospital and second to our restricted possibilities to operationalize the concepts of need and demand by items of the standardized patient record system.

For this study there was only one item at our disposal for operationalizing a patient's demand for care, namely that the patient himself decided to come to the psychiatric emergency service. Therefore we must assume that we probably underestimated the proportion of demand in the sample investigated. For example, demand for contact in the emergency service could not be registered if a patient by his own request obtained an official referral to the emergency service by a general hospital. Facilitated by location, doctors of the general hospital might have been more inclined to consult a psychiatrist in cases of psychiatric problems, even if the disturbances did not need immediate psychiatric intervention. For example, a study on psychiatric emergency care [29] showed that only 31 % of the patients referred to a psychiatric emergency service by general practitioners were in danger. In 69 % of cases, other reasons were responsible for referring patients to the service.

Despite the presumed underestimation of demand in this study, more than one third of all contacts patients of the psychiatric emergency service in Mannheim indicated a demand for emergency service. The significant increase of demand and the slight decrease of need from first contacts to all contacts point to a special help-seeking behavior of frequent users and may be one cause for the career of so-called high users of a psychiatric emergency service [9, 10, 23].

Because the proportion of contacts with need for emergency care differed only slightly between the 23 districts of Mannheim, the topographic distribution of the utilization rates could not be explained by need. A higher age of patients living in those districts was the only factor related with a higher amount of need for an emergency service. Although the utilization of the psychiatric emergency service is influenced by socio-demographic and ecological characteristics of the districts, the percentage of contacts with a need for emergency service is nearly independent of these factors. An exception was found for the utilization of schiz-

ophrenics. These patients had a lower proportion of need in districts with high utilization rates and a higher proportion in districts with medium or low rates. Since these patients are predominately living in the city center near the psychiatric emergency service and have mostly been treated in the CIMH for a long time, they are familiar with this institution and are inclined to visit its emergency service, even when there is no need, but when they feel any demand for it. In cases of true need for an emergency service, however, schizophrenic patients go to the service, even when they have to spend some time traveling.

In contrast to the topographic distribution of need, the distribution of demand shows a clear similarity to the topographic distribution of contact rates. For both first contact and contact rates, a significant influence of the proportion of demand on service utilization was found, even if ecological and socio-demographic variables and the accessibility of the service were taken into consideration. The interaction between demand and accessibility indicates that the effect of demand on service utilization increases with shorter distance between the patient's residential area and service location.

More over, socio-demographic and ecological factors are correlated with the amount of demand. Especially patients with social risk-factors seem to have an increased demand to contact the emergency service. Especially the demand for the utilization of the psychiatric emergency service increases with aggravating ecological conditions, and unfavorable living conditions were predominant in districts with shorter distance to the emergency service. Beyond this, the negative correlation between the percentage of contacts with need and demand underpin that in districts with a high percentage of patients with demand for contact with the emergency service, need must not necessarily be just as high. This is especially true for districts lying near the psychiatric emergency service. Like all other psychiatric facilities of the CIMH, it is located in the city center.

The distribution of diagnoses in the psychiatric emergency service of Mannheim is similar to that observed in other services of this kind [7, 19]. The proportion of demand differs in a wide and plausible range between the diagnostic groups. For neurotic disorders, disorders of personality and behavior and for psychotic disorders the amount of contacts with demand is remarkably higher (40% or more) than for the other groups (34% or less). Probably these differences in the amount of demand reflect special types of help seeking behavior, dependent on the specific mental disorder and increasing during a patient career. With the exception of organic and symptomatic mental disorders in all other diagnostic groups, the demand increases with increasing contact rates.

Over all, the study showed that in addition to socio-demographic, ecological and distance-related characteristics the influence of subjective demand should be taken into account when explaining topographic differences in the utilization of a psychiatric emergency service. In which way subjective demand is induced or supported by ecological or socio-demographic characteristics of the residential areas of the patients is hard to say, but a mutual dependence of

these factors must be assumed. In this investigation the special living situation as well as unfavorable ecological conditions seem to increase the demand for care.

The comparison between first contact rates and contact rates yielded an increasing proportion of contacts with demand in the course of a patient's career. This can be interpreted in two ways: for repeated contacts with need together with demand it can be understood as a sign of a well functioning mental health care system in which experienced patients in case of need immediately look to well-known help. On the other hand, patients with demand but without need are misusing the psychiatric emergency service and should be referred as soon as possible to other types of care, which can meet their demand in a more effective way.

Further investigations with an extensive operationalization of need and demand should be undertaken in order to confirm our results and to replicate the relation of demand with ecological, socio-demographic and diagnostic factors.

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