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Determination of the Optimum Period of Interview for Retrospective Collection of Data

An Empirical Study Based on Reported and Documented Outpatient Contacts of Depressive Patients

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Summary. On the basis of reported and documented data on outpatient contacts of depressive patients, the reliability of data on the use of services, and the possibilities and sources of errors in the retrospective collection of data are presented and discussed. The results show an increase in errors the longer the period of inquiry is removed from the time of interview. The retrospective collection of data about ambulatory care more than 6 months ago has to be questioned from a reliability point of view. The correct dating of outpatient contacts succeeds substantially more reliably when questioned about periods of 3 months than about monthly periods, which leads to implications for the definition of patterns of care.

Key words: Outpatient psychiatric care – Patterns of care – Reliability – Retrospectively collected data – Depression

Introduction and Problem Definition

In service research the evaluation of services and health care planning are based on data of service utilization. Central case registers, in which data on patients' contacts with the various psychiatric services existing in an area are pooled, offer an optimum means of obtaining information about the contacts of patient groups with psychiatric services. Since case registers or documented data are not always available, the only way of obtaining comprehensive information on the use of services in the periods between interviews is frequently the questioning of study populations.

In psychiatric follow-up studies, for example, patients or close reference persons are questioned about course of illness, use of services, life events etc. in a certain period of time in the past. Depending on how far back in time the periods in question are from the time of interview the memory performance of the respondents will be of importance, and as the periods concerned become more remote, errors of recall, such as forgetting, falsification or incorrect dating are expected to increase.

In the field of the psychology of memory several studies have been conducted on information storage and reproduction over time. As early as 1885 Ebbinghaus, studying the method of decreasing effort in relearning meaningless syllables in a self-experiment, found that retention declined rapidly in the beginning and then more slowly.

Later experiments with differing conditions have shown that the curves for forgetting for colours, forms and combinations of letters or motor abilities exhibit differing patterns and that the methods of learning and testing are important factors influencing the results (Meili and Rohracher 1972; Foppa 1975). In general, memory performance over time seems to be highly dependent on the material, the way the tasks are formulated and other concomitant circumstances.

Comprehensive studies on memory performance in connection with retrospective data collection have been conducted in life event research (Uhlenhuth et al. 1977; Veiel 1983). Brown and Harris (1982) showed that errors in recalling life events are influenced by the severity of the events and that the errors mainly occur in recalling events less salient for the respondents. In a review Dehmel and Wittchen (1984) concluded that the curves for forgetting in life event research, as in the experimental studies conducted in the field of the psychology of memory, are highly dependent on the method of inquiry, definition of the areas of events and the techniques of evaluation. The authors concluded that events of high emotional importance are recalled better than less severe events even for more distant periods of time. However, they did not consider the quality of dating events very reliable. Wittchen and Burke (in press) and Teder and Wittchen (in press) observed the quality of recalling symptoms and severe life events to be good, whereas the reported frequency of pleasant and everyday events declined over time.

In the methodology of life event research memory effects are usually assessed indirectly. For normal populations the decrease in the frequency of events remembered with growing distance from the occasion of interview is used as an indicator for forgetting. Better opportunities of testing memory effects in normal populations and clinical samples are offered by test-retest studies or a comparison of the information stated by probands and their relatives. Jenkins et al. (1979) examined 382 gainfully employed men (who were not patients) in order to test the reliability of recalling life changes that had occurred in a 6-month period. The probands were questioned about the same period in two interviews that were 9 months apart. They found that in the case of three life event scales the frequency of events recalled decreased by 34% to 46% from the first to the second interview. Besides the high rate of forgetting they also observed additions.

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The aim of the present study was to test what kind of errors can be observed in retrospectively collected data on outpatient contacts and which period of time seems to be optimal when collecting data retrospectively.

The information stated by the patients about their outpatient contacts at the Central Institute of Mental Health (CIMH) was compared with the case histories documented at the CIMH. By using the data documented by the care facility as an objective external criterion it was possible to test the validity of the reported data on service utilization with regard to the number of contacts, correctness of dating and depressive symptomatology.

Sample and Procedure

The data were collected from a sub-sample of a cohort of depressive patients who had received outpatient and/or inpatient treatment at the Psychiatric Department of the CIMH from May 1981 to September 1983. In this sub-sample were included those patients who had received treatment at the CIMH Psychiatric Outpatient Service or who reported to have been treated at the CIMH Outpatient Service and on whose contacts information could be obtained for the entire 18-month period of study.

The patients, as in the study of Keller and Shapiro (1981), underwent a detailed examination after the first interview (point of time 0) and on three follow-up occasions after 6, 12 and 18 months within the research project. In each of the examinations the patients were asked how often they had contacted the CIMH Outpatients Service 1, 2, 3 ... etc. months ago. In doing so the period after the preceding interview, usually 6 months, was covered retrospectively month by month. In approximately 25% of the patients, between the first and fourth interview, only one further interview could be administered; for patients interviewed four times, the follow-up interviews were not always exactly 6, 12 and 18 months after the initial interview. Therefore, information in some cases was gathered for a longer period than the preceding 6 months or for an entire period of more than 18 months. However, for each patient information was obtained for a period of at least 18 months after the first interview, and it was for this 18-month period that documented and reported data were compared.

At each interview the depressive symptomatology for the preceding 4 weeks was assessed by means of the WHO Schedule for the Standardized Assessment of Depressive Disorders (WHO SADD 1983). In the period between the interviews the patient had – irrespective of the research project – contacts with the CIMH Outpatient Service. In this context a "contact" was defined as appearance in person at the Outpatient Service.

Only patients attending the Outpatient Service were included in the study, because the reliability of the reported data could only be tested for the CIMH Outpatient Service, not for private psychiatrists or other facilities. The present study was therefore based on 61 patients.

Results

A. Agreement Between the Number of Reported and Documented Contacts

To test the agreement between the number of reported and documented contacts the total of reported contacts for the 18 months after the first interview was compared with the total of documented contacts in the same period.

Table 1. Comparison of patients according to the frequency of reported and documented outpatient contacts at the Central Institute of Mental Health in Mannheim over 18 months ($n = 61$)

Number of reported contacts		Number of documented contacts					
		0	1–3	4–12	13–24	Over 24	Total
0	*n*	–	6	2	–	–	8
	%	–	9.8	3.3	–	–	13.1
1–3	*n*	1	8	–	–	–	9
	%	1.6	13.1	–	–	–	14.7
4–12	*n*	–	1	9	5	–	15
	%	–	1.6	14.8	8.2	–	24.6
13–24	*n*	–	–	6	8	3	17
	%	–	–	9.8	13.1	4.9	27.9
Over 24	*n*	–	–	–	4	8	12
	%	–	–	–	6.6	13.1	19.7
Total	*n*	1	15	17	17	11	61
	%	1.6	24.6	27.9	27.9	18.0	100.0

Of the 61 patients included in the study 52 patients had had contacts with the CIMH Outpatient Service both according to their own statements and the case histories documented at the CIMH. Eight patients reported not to have had any contacts in the period of observation, but had in fact had 1 to 4 documented contacts. One patient reported a contact with the Outpatient Service, which, however, turned out not to be documented.

A comparison of the measures of central tendency of the figures for the reported and the documented contacts for the 18-month period of observation yielded almost identical values. For the reported data a mean of $\bar{x} = 14.9$ and a median of 10.4 were obtained; for the documented data the mean was 14.8 and the median 10.9. Statistically the central tendencies of the reported and the documented contact figures did not differ significantly, the Wilcoxon Z value being -0.004 ($P = 0.996$). Only 13% of patients were able to give the exact number of documented contacts, 48% reported too few and 39% too many contacts. For patients with several contacts the differences between the actual and reported numbers (absolute value of error) were significantly greater in absolute terms than for patients with fewer contacts; as percentages of the total number of contacts (percentage value of error), however, they were less marked. The correlation between the number of documented contacts and the absolute value of error was $r = 0.43$ ($P < 0.01$), while the percentage value of error at $r = -0.31$ ($P < 0.01$) significantly negatively correlated with the total number of contacts.

When differences of ≤ 3 contacts and percentage deviations of $\leq 50\%$ were chosen as the limits of tolerance, 80% of the patients fulfilled one or both of these criteria. When the limits of tolerance were narrower or wider, the proportion of patients stating sufficiently exact information changed correspondingly.

Table 1 shows the relationship between the reported and the documented numbers of contacts in the 18-month period of observation for various treatment categories. The categories were defined as follows: no contact (0); a few or isolated contacts (1–3); treatments with an average of fewer than 1 contact per month (4–12); with an average of 1 contact per month

(13–24) and treatments with an average of more than 1 contact per month (25 or more).

The Table illustrates two things: first, from the distribution of the documented contacts it can be seen that the various treatment categories were almost equally frequent among the patients in outpatient care. Only the category of more than 1 contact per month (more than 24 contacts) was somewhat less frequent. The distribution of the reported contacts displayed a more or less similar pattern, the only striking difference being that as many as 13% of the patients who mostly had only a few documented contacts forgot to report these. Second, from the data presented we can calculate that a total of 53% of the patients were assigned to the same treatment categories on the basis of both reported and documented data.

When the correlation between the documented and the reported numbers of contacts was calculated a very high product-moment correlation coefficient of $r = 0.92$ was obtained, corresponding to a common variance of approximately 85%.

Provided that the differences between the reported and the documented data were largely attributable to memory effects, the error of recall, i.e. adding or forgetting contacts, amounted to just under 15%.

B. Dating of Outpatient Contacts

While in part A the measures of central tendency of the data were compared and the correlations of the documented and the reported data were analysed without taking into account the temporal distribution, part B will deal with various temporal aspects.

Since in our study at each of the three follow-up-interviews information about outpatient contacts was collected retrospectively month by month, the contacts of each patient could be arranged into a record system of 18 monthly intervals, as in the studies of an der Heiden and Klug (1980) and Bell et al. (1985). A comparison of the reported and the documented data over the 18-month period revealed for which months contacts were reported and for which months they were documented. The number of contacts per month was not considered, i.e. it was merely checked whether the reported and the documented data about the treatment received agreed.

On average the 18-month period included 6.6 months for which contacts were reported and documented. The patients reported 1.8 treatment months too many and 0.8 months too few. The predominance of the excess of reported treatment months can be explained by a tendency of the patients to report contacts at more regular intervals than was actually the case.

Since in the case of 9 patients no contacts were either reported or documented and it was thus not possible to study the temporal agreement, the following analysis is based on the remaining 52 patients. The aim was to determine changes in agreement between reported and documented contacts when longer time periods were evaluated and, consequently, data of lower temporal accuracy were compared. When the period of observation was divided into 18 1-month, 9 2-month, 6 3-month and 3 6-month intervals[1] and whether there was a contact or not for each interval was checked, the agreement between reported and documented data increased as the periods in question became longer. When monthly periods were used the data were in agreement for only 23% of the patients, but the figure rose to 40% for 2-month periods and to 63% for 3-month periods. Finally, for all the 3 6-month periods the reported and the documented data based on the question whether there had been a contact in each 6-month period or not were in agreement for 81% of the patients.

[1]Since the total period of observation covered 18 months and the interviews were usually administered after 6 months, the sub-time periods had to be contained in 6 or 18 as whole numbers.

Table 2. Agreement between reported and documented treatment months in relation to the distance from the time of interview

Agreement		Distance from the time of interview (months)							
		1	2	3	4	5	6	7	8
Yes	*n*	54	62	56	68	54	45	23	12
	%	88.5	77.5	70.0	76.4	67.5	66.2	56.1	57.1
No	*n*	7	18	24	21	26	23	18	9
	%	11.5	22.5	30.0	23.6	32.5	33.8	43.9	42.9

Consequently, the greater the accuracy with which the treatment contacts are placed in time the more errors will occur. The decrease in the agreement between the reported and the documented treatment intervals was the greatest when the interval considered shortened from 3 to 2 months. Since the division of the observation period into shorter time periods was a pre-condition for more accurate dating of the contacts on the one hand, but led to a rise in the empirically observed rate of errors, it was important for practical purposes to make a sensible compromise between these two opposite aspects of the reliability of the reported data. Such a compromise was reached at 3 months.

Furthermore it is to be expected that not only the division of the observation period into shorter or longer sub-periods but also the distance from the time of interview influences the ratio between correct and false datings in the sense that the datings for periods not too distant from the time of interview are made more correctly than those for more distant periods.

Table 2 presents the percentage of positive agreements (contact both reported and documented) for months with differing distances from the time of interview[2].

Table 2 shows that as the distance from the interview increased the percentage of correct assignments of outpatient contacts to monthly periods fell from 88% in the 1st month to 57% in the 8th month.

When the distribution of errors of the 9 patients with either reported or documented contacts were also taken into account, all the errors were found to be concentrated on time periods further than 3 months from the interview. Thus, with growing distance from the moment of interview a continuous increase in the rate of errors was observed for a retrospectively studied period of 8 months preceding the interview.

When the frequency of contacts dealt with in part A was related to the number of errors in dating contacts on a

[2]Since it was not possible to interview all the 52 patients at exactly after 6, 12 and 18 months as planned and since not all patients had had reported or documented contacts in every month, differing numbers were obtained empirically for months with differing distances from the moment of interview. For months further than 8 months from the interview the empirically observed frequencies were low (under 10) and have therefore not been included in the Table. If a patient was interviewed at the time points 0, 7, 12 and 20, information was also obtained for the 7th and 8th month preceding the interview, while the 2 months immediately before the time point 20 were not included in the evaluation, because for all patients only the first 18 months after the first interview were evaluated.

Table 3. Correct and incorrect datings of documented and reported treatment months for the 6-month periods prior to each of the three follow-up interviews in relation to symptomatology on these occasions ($n = 106$ measurements)

Dating		Depression score		Total
		Low	Elevated	
Correct	*n*	9	34	43
	%	23.7	50.0	40.6
Incorrect	*n*	29	34	63
	%	76.3	50.0	59.4
Total	*n*	38	68	106
	%	35.8	64.2	100.0

monthly basis, the sum of the correctly dated treatment months was found to correlate highly ($r = 0.79$ or $r = 0.82$) with the number of documented or reported contacts. There was no significant correlation ($r = 0.01$ or $r = -0.14$) between the number of falsely dated treatment months and the frequency of contacts. Therefore, the percentage of false datings as a ratio of false and correct datings was lower for patients with a high number of contacts than for patients with a low number of contacts ($r = -0.34$ or $r = -0.44$). The difficulties of dating contacts seemed to be the greatest when the number of contacts was medium-sized, whereas patients who saw their doctor rarely or frequently made more reliable datings.

C. Relationship to Depressive Symptomatology

Since the data for the evaluation of agreement between reported and documented outpatient contacts described in parts A and B were collected from depressive patients, it was important to test the influence of depression and its course on the reliability of information about outpatient contacts. The results of past research into memory performance in depressive patients indicate that depressive persons partly show deficits in short-time memory and in recalling pleasant events. In the case of long-term memory and with regard to neutral or unpleasant stimuli they perform equally well or better than healthy controls (Lloyd and Lishman 1975; Sternberg and Jarvik 1976; Fogarty and Hemsley 1983; Sengel and Lovallo 1983).

The depression scale we used includes 17 of the 40 items contained in the WHO/SADD. The scale has been obtained by factor analysis, and it has proved to be a dependable indicator, of the severity of depression in reliability and validity tests (Haffner and Moschel 1983). Evaluation of our data showed that there was no relationship between the average depression score for the three follow-up interviews and the number of reported or documented contacts or the number of treatment months. With respect to the measures of difference and error slightly negative correlations were obtained, and the total number of incorrectly dated months at $r = -0.27$, $P < 0.05$ significantly negatively correlated with the average depression score. Patients with less favourable courses of symptoms stated the frequency and temporal distribution of outpatient contacts equally accurately or in some cases even more accurately than patients with a favourable course.

When for each follow-up interview the association between depression and the dating of contacts in the previous 6 months were tested and the values obtained for the three points were summed, the results presented in Table 3 were obtained. Measurements that could not be conducted and 6-month periods with no contact have not been included.

Table 3 shows that if the depression score was low at the time of a follow-up interview the reported information about the outpatient treatment received in the previous 6 months was in 1/4 of the cases totally identical with the documented data. If the depression score was elevated, in half of the cases no errors were observed. Thus patients who were more depressed at the time of interview could date the contacts more reliably. Patients whose scores on the depression scale were less than two standard errors of measurement above zero (scores 0–4) were assigned to the category of "low depression score" and those with higher scores to that of "elevated depression score".

Discussion and Conclusions

When time periods are judged with respect to the occurrence of certain events, two aspects are of importance. The first is the frequency of the events to be measured and the second their temporal distribution. In our study, investigating outpatient contacts over a given period of time retrospectively led to the questions "how many contacts" and "when". Our study, extending over 18 months, showed that the reported and the documented information on the frequency of contacts was well in agreement when the interviews were conducted at an interval of 6 months.

Dating obviously caused greater difficulties to the patients in that the more accurately they were asked to date the contacts and the more distant the event in question, the higher the rate of errors. When monthly periods were used, data for the month immediately prior to the interview was reported most accurately, the proportion of correct datings being 88%. If the finding also applies to symptomatology information, it can be assumed that the data obtained by standardized interview instruments like the WHO/SADD (General Health Questionnaire; Present State Examination) questioning about the monthly period preceding the interview, are only slightly marred by errors of recall, such as forgetting or incorrect dating. Although the short period of 1 month is recalled reliably, yielding dependable data, longer interview periods are generally chosen in practice. In follow-up studies it is frequently impractical (costs or uncooperativeness of the patients) to administer interviews at an interval of 4 weeks (Shapiro et al. 1984, 1985). The question arises how retrospective can questioning be without straining the memory of the respondents unduly. In the literature a period of 6 months at most has been proposed (Shapiro et al. 1984, 1985; Cannell et al. 1977; Cannell and Fowler 1977). On the basis of their comprehensive test-retest studies Jenkins et al. (1979) recommended limiting the retrospective collection of data on life events and illness courses to the 6 previous months for reasons of validity. Our study, too, shows that contacts further than 6 months prior to examination were assigned unreliably to the months in which they occurred. These findings indicate that it is not advisable to collect information about outpatient contacts retrospectively on a monthly basis for more distant periods; larger subperiods should be used because it becomes increasingly difficult, to assign events to short periods of time.

If longer time periods are studied retrospectively it is advisable to choose a 3-month basis, since a more satisfactory

agreement between reported and documented data concerning the question whether contacts had occurred or not will be achieved. Our empirical results achieved on information provided by the patients seem to justify the demand for a treatment-free interval of at least 90 days between treatment episodes (Wing and Hailey 1972; ten Horn et al. 1986). This is true for reasons of reliability, particularly for retrospectively collected data, whereas for data documented in case registers a stricter criterion could theoretically be used.

The upper limit of 6 months seems according to our findings applicable to the course of symptomatology since our results were based on a relatively easy to answer question, i.e. had there been a contact or not. The reliability of the rather subjective statements on symptom course, influenced as they are by the severity of the disorder, is unlikely to be higher when longer time periods are chosen. Errors of recall, such as forgetting and incorrect dating, will probably increase as the symptoms concerned become more remote. Andreasen et al. (1981) reported the agreement of information provided by different raters on symptoms and diagnoses to have been good or even excellent in test-retest investigations in which the SADS life-time version was used. In the case of depressive illness however, the raters had difficulties with various aspects of illness course, such as time of onset, episodic or chronic course, number of episodes or manifestation or earlier symptoms (Keller et al. 1981a, 1981b). Given the results of our study and the findings of Cannell et al. (1977) and Cannell and Fowler (1977), the question arises as to what extent the results of Keller and Shapiro's study (1981) were influenced by memory performance. In their study, information for six-degree severity ratings was collected retrospectively over a period of 6 months by using weekly intervals. A number of studies on the course of depressive disorders showing a shortening of the symptom-free intervals between the depressive episodes have examined longer time periods retrospectively (Angst 1966; Matussek 1965). In view of the problem of reliability it remains an open question to what extent memory performance has played a role in these studies since the episodes of illness closer to the moment of interview were better recalled (and probably also more frequently documented in case records), resulting in an apparent shortening of the symptom-free intervals. Reliable findings on the course of symptoms are to be expected from prospective course studies, in which cross-sectional data are collected on several occasions.

Are the findings of our study applicable to retrospectively collected data in general, i.e. should the discussed limits of the functioning of memory be more restricted for depressive patients than for other study populations? This need not be assumed on the basis of the literature. Our study revealed that patients in a depressive state dated their outpatient contacts more accurately than patients whose depression scores were not elevated. Wagner et al. (1980) using a different study population, reported results that permit similar conclusions about the reliability of retrospectively collected data. Comparing the frequencies of reported and documented outpatient treatment contacts over a period of 1 year prior to interview for the probands ($n = 543$) of a field study that was conducted to test the relationship between medical care and diastolic blood pressure, they found considerable differences. What is interesting is that in their study probands with a more conspicuous symptomatology gave more reliable information on outpatient contacts than probands whose blood pressure was normal or slightly elevated. For 21.4% of the sample there were reported but not documented contacts or documented but not reported contacts in the year prior to the interview. The results of our study thus seem not to be limited to depressive patients only.

Life event research has also produced results similar to our findings: with growing distance from the time of their occurence the reported frequencies of everyday events fall (Brown and Harris 1982; Hönmann and Schepank 1983; Dehmel and Wittchen 1984). These findings and those of Wagner et al. (1980) suggest that the differences observed between reported and documented data are not only to be found in depressive patients, but reflect the limits of the functioning of memory in general, which affects retrospectively collected data. Retention seems to be influenced not only by the degree of difficulty of the memory performance required, which in turn depends on the length of the time period to be recalled and the accuracy of the dating of an event, but also by the importance of the event in question. The more important the life event or the more conspicuous the symptomatology concerned the better are the corresponding facts recalled.

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