The Development of a Medication Reminder Card for Elderly Persons

Ruby Grymonpre, Cathy Sabiston and Brenda Johns

ABSTRACT

This paper describes the development and testing of a medication reminder card specifically designed for elderly persons on complex drug regimens. The need for such a system was confirmed by a survey of approximately 100 Canadian hospital pharmacy departments where no system provided at discharge by respondents met with our criteria for the "ideal" card.

The new medication reminder card was tested in 29 ambulatory and 16 institutionalized elderly persons. Over 75 percent of patients continued to use the card two weeks post enrollment and a majority of ambulatory elderly were still using the card at six weeks. In addition to organizing medications and providing a reminder for patients to take drugs, the card facilitated communication with the pharmacist (a mean of 20 minutes) and with other health care professionals.

Patients found the card easy to read and the system easy to understand. Despite time constraints, eight of nine participating community pharmacists indicated they would continue to use the system for select patients. A major obstacle to the use of the card was patient reluctance, for a variety of reasons.

Although the card will require further modification in design, it provides a useful alternative as a compliance aid for ambulatory and hospitalized patients on chronic, complex drug regimens.

Key Words: *elderly, compliance aid, patient compliance*

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RÉSUMÉ

Cet article décrit l'élaboration et la mise à l'essai d'une carte de rappel de médicament conçue expressément pour les personnes âgées qui suivent des régimes de médicaments complexes. Le besoin d'un tel système a été confirmé par un sondage effectué auprès d'environ 100 département de pharmacie d'hôpitaux canadiens où aucun système de ce genre dispensé à la sortie de l'hôpital par les personnes interrogées n'a rencontré nos critères de carte "idéale".

La nouvelle carte de rappel de médicament a été mise à l'essai chez 29 personnes âgées ambulatoires et 16 hospitalisées. Plus de 75 pour cent des malades continuaient à utiliser la carte deux semaines après l'inscription et une majorité de personnes âgées ambulatoires utilisaient encore la carte six semaines après. En plus d'assurer un horaire d'administration des médicaments et un rappel de prendre leurs médicaments pour les malades, la carte facilitait aussi la communication avec le pharmacien (une moyenne de 20 minutes) et avec d'autres professionnels de soins de santé.

Les patients trouvaient la carte très facile à lire et le système facile à comprendre. Malgré la contrainte de temps, huit des neuf pharmaciens communautaires participants ont indiqué qu'ils continueraient à utiliser le système pour quelques patients choisis. Un obstacle majeur contre l'utilisation de la carte était l'hésitation des malades, ceci pour diverses raisons.

Bien qu'il faudra modifier davantage la conception de la carte, elle assure une alternative utile en tant qu'outil de fidélité au traitement pour des patients ambulatoires et hospitalisés qui suivent des régimes chroniques et complexes de médicaments.

Mots clés: *personnes âgées, outil de fidélité, fidélité du patient*

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INTRODUCTION

Approximately 80 percent of persons aged 65 and older are taking medications and are receiving their potential benefit.[1] Indeed, appropriate use of medications is the least expensive most cost effective component of health care costs.[2] Unfortunately, nonadherence to drug therapy is one of the most common causes of institutionalization in the elderly.[3]

Due to the complex nature of drug noncompliance in the elderly, no single intervention can be expected to ensure optimal drug taking behavior in all older adults. A limited number of compliance aids are already available including the "Pharmacy Pill-Pak", the "Dosett", the "Pill Reminder", and an assortment of small plastic pill boxes.[4] Although each system has its own distinct advantages, the authors felt there needed to be a relatively inexpensive system which would facilitate patient-pharmacist communication, increase drug knowledge, provide a system for patients to remember when to take their medicines, and to check whether or not they have in fact been taken. Since the greatest risk for drug-related problems is in elderly heavy drug users,[5] the proposed medication reminder system was also designed specifically for elderly persons with complex, chronic drug regimens.

The objective of this project was to design and test a medication reminder card for use by elderly persons on complex drug regimens.

METHODS

The project involved three phases:

Phase I: needs assessment and system development

Phase II: preliminary test of the system

Phase III: system modification and final test

Phase I

Prior to designing a new medication reminder card, background information was necessary to determine systems currently available in Canada to identify specific problems with existing cards, and to establish criteria for the "ideal" medication reminder card. A letter was sent to the pharmacy departments of all hospitals in Winnipeg, Manitoba and 90 randomly selected hospitals across Canada (list available upon request) to determine the types of drug compliance aids provided to elderly patients at discharge. To identify specific problems with existing cards, the 20 nurses who offer a Self Medication Program (SMP) on the Geriatric Assessment Unit (GAU) at the Health Sciences Centre General Hospital were surveyed. They were asked to provide general comments about the benefits and disadvantages of the medication reminder card system currently being used in their program (Figure 1). To ensure a 100 percent response

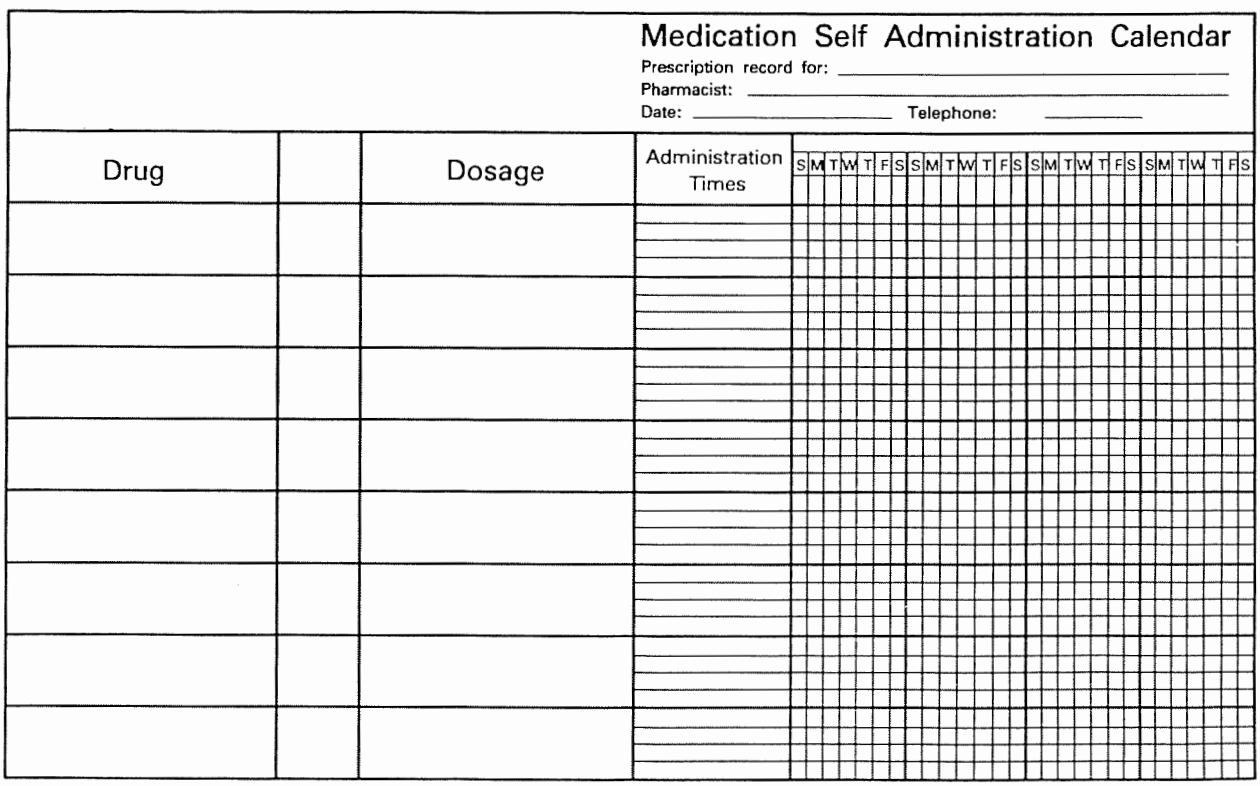

Figure 1: The Previous Medication Reminder Card

rate, a list was kept of all nurses responding to the survey.

Criteria for the "ideal" card were then developed (Appendix 1). These criteria were based on a review of the literature[6-9] and several assumptions and philosophies;

1. Compliance decreases with increasing complexity of the drug regimen.
2. Due to the pharmacokinetic and pharmacodynamic changes associated with aging, it is rarely necessary to exceed QID dosing in the elderly.
3. Over 90 percent of all medications, if taken the same way each day, can be taken with food without clinically significant adverse consequences.
4. Although knowledge about a prescribed drug regimen does not guarantee compliance, it does improve adherence.
5. Elderly persons with functional limitations and language or literacy problems require the greatest assistance in ensuring proper medication use.

Based on findings of the two surveys and the criteria developed, five different systems were designed and presented to 10 community pharmacists, approximately 60 senior citizens, and six Victorian Order of Nurses (VON). The comments made by these groups were used to design the final medication reminder card (Figure 2). The card measures 27 cm x 36 cm in size which allows sufficient space for writing the drug name, strength and purpose (4 cm x 14 cm). Space is provided down the center of the card for four prescription vials (with lids) corresponding to a QID dosing regimen. Sufficient copies were then printed for the preliminary test.

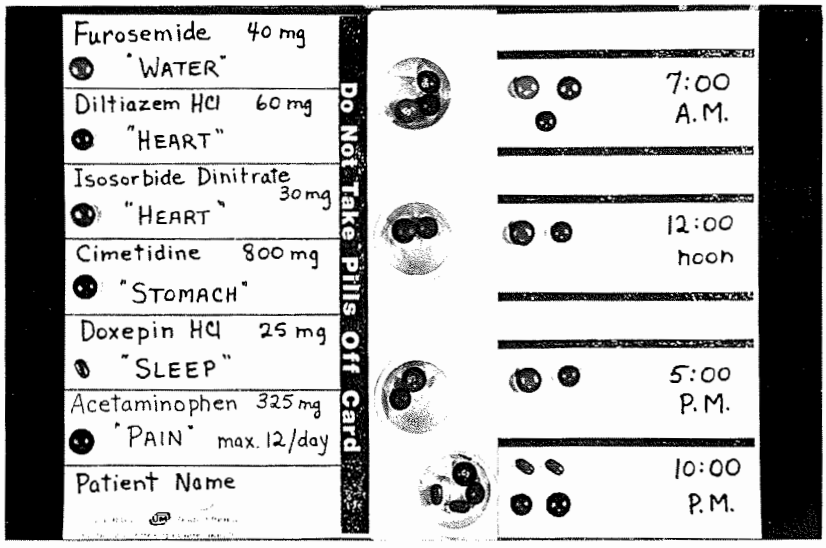

Figure 2: The "New" Medication Reminder Card

Phase II

The new medication reminder card was first tested in the Self Medication Program (SMP) on the Geriatric Assessment Unit (GAU) of the Health Science Centre General Hospital to provide a controlled and supervised environment. This preliminary test was designed to determine acceptability of the new medication reminder card by the ward nurses as compared to the card they used previously. The second objective was to assess whether the new card facilitated drug taking by older patients upon hospital discharge. Nurses were given an orientation on how to initiate patients on the new system, and all cards used previously in the SMP were taken off the ward. All patients enrolled in the SMP from October 15, 1988 to January 4, 1989 were initiated on the new system by the ward nurse. During the same time period, patients 65+ years of age on the General Medical Ward of the same teaching hospital were used as a control group. These patients were counselled at discharge by a hospital pharmacist in the usual way using the old card. Attempts were made to select a control group matched for age, sex and numbers of drugs however, due to time constraints this became an impossibility.

Data documented on each patient enrolled in the trial included patient's name, age, sex, numbers and types of drugs prescribed at discharge (including drug regimen), mini-mental status exam (MMSE), the patient's telephone number and the name(s) and telephone number(s) of other care provider(s). Nurses using the new system were also asked to document time required to fill out the card, problems encountered in filling out the card, time for initial patient counselling regarding use of the card, and problems encountered by patients using the system while in hospital.

Approximately two weeks post-discharge all patients enrolled in the trial were telephoned to determine whether they were still using the system offered to them in hospital and to assess the patient's knowledge base regarding the names and purposes of their medications. The interviewer also made a subjective assessment of patient compliance based on questions asked during the telephone interview. If the patient stated that they were taking medications as prescribed and indicated no prob-

lems with their current drug regimen, good compliance was assumed. All interviews were conducted by one pharmacy student who was blinded to the system used by each patient. The findings of this preliminary test provided the basis for phase III which was to be a trial involving the community pharmacist and the non-institutionalized elderly.

Phase III

Only minor modifications to the medication reminder card were necessary at this point. However, in order to facilitate use of the system by community pharmacists, a "package" was developed. The "package" was designed to provide background information about the system, information on how to initiate patients on the card including how to make up the card and what instructions should be communicated to patients, plus supplementary literature which would assist the pharmacist in designing a "readable" card and a most simplified drug regimen. Other information included in the "package" were Patient Information Sheets to be provided to each patient initiated on the system and a variety of auxiliary labels for dosage forms which cannot be glued to the card (e.g., injectables), acute medications, and times of day for people who are non-English speaking or who are illiterate.

Eleven community pharmacists were asked to participate in the trial. Pharmacists were selected based on their active involvement and outstanding reputation in the Faculty of Pharmacy, Community Practice Program. Pharmacists were each provided with the Medication Reminder Card Package and all pharmacists were given an orientation on how to initiate patients on the system. Pharmacists were instructed to enroll 10 eligible patients within 10 working days, between June 12 and June 23, 1989. Enrollment involved obtaining written informed consent, preparing a medication reminder card, and counselling each patient on the system and the medications prescribed. Eligibility criteria included patients:

(i) 65+ years of age
(ii) prescribed three or more medications on a TID or QID regimen
(iii) with a medication profile dating back to June 1988
(iv) who obtain all prescribed medications from the same pharmacy

A home visit was conducted three to four weeks after enrollment in the trial to determine whether the patient was using the system and to determine patient acceptability of the system. A patient was considered to be using the system only if, at the time of the visit, the card was filled correctly. Also during the home visit, a pill count was taken on all current medications to calculate patient compliance while using the medication reminder card. Compliance prior to study enrollment was calculated using the patient's medication profile from June, 1988 to June, 1989. The equations used to calculate compliance at baseline and while using the card are illustratd in Appendix II. Approximately six weeks after study enrollment, a follow-up telephone call was made to all patients who were using the system at the time of the home visit to determine whether they were still satisfied with the system.

Tests for statistical analysis included Chi Square and the Student-ized t-Test. A p value less than 0.05 indicates a statistically significant difference for a two-tailed test.

RESULTS

Phase I

Of 100 surveys sent to Canadian hospital pharmacy departments, 49 were returned. Of the 49 pharmacy departments, 11 (22%) provided no written or verbal information to elderly patients at discharge, 18 (37%) provided written information, and seven (14%) provided a wallet card listing medications. Although 13 pharmacy departments (27%) used a medication reminder card which was filled out by the pharmacist, none of these cards met with our criteria for the "ideal" medication reminder card.

The results of the nurses survey suggested that, in general, their current system was helpful in that the patients kept and used the card and the card served as a reminder to take the medications correctly. To a limited extent, the current system also increased knowledge about the medications being taken. On the other hand, nurses found that most patients had difficulty reading the current card, they had trouble understanding how to use the system, and the system did not clearly indicate dosing times for each medication. In addition, patients had to make a check mark in the appropriate box to indicate a medication had been taken. This extra step was rarely completed by patients using the system.

Phase II

During the preliminary trial period, eight nurses initiated 16 patients on the new system and five patients were discharged from hospital with the old card. Although study patients on the GAU were older than patients on the GMW (83 ± 7 vs 73 ± 10, $p<0.03$), there was no significant difference in the proportion of females (12/16 vs 2/5) and mean number of drugs (4.3 ± 1.1 vs

5.2±1.6) between the two groups.

The average time required for nurses to fill out the card and counsel patients was 30 minutes. There was, however, a decrease in time required to initiate the system from the beginning of the trial to the end. Limitations of the card identified by the nurses included difficulty in incorporating "every four hours" or "every other day" regimens onto the card. Nurses found the system difficult to use in patients with declining mental status (MMSE < 26/30) and in non-English speaking patients. It also became evident from this test that the card was only effective for patients on chronic, stable drug regimens since a new card had to be made each time the drug regimen changed. On the other hand, nurses found the card much easier to use than the former card.

Of the 16 patients discharged on the new card, eight could not be contacted for a follow-up telephone interview (patient confused, patient not available, poor hearing, refused to talk to interviewer). Of the eight patients who were contacted, six were using the card as directed at the time of the telephone interview although for one of these patients the son was filling the card for the father. One of the patients not using the system had a VON who was using the card to fill the patient's Dosett, the system used by the patient prior to hospitalization. A second patient reported using the system until he memorized his regimen. Five patients using the card knew the names and purposes of their medicines. However, all eight patients were compliant with their drug regimen according to the interviewer. Of the five patients discharged on the old system, no patients were using the card at home although one patient did report using the card to set up his own system. Although only two patients knew the names and purposes of their medications, four of five patients in this group were considered to be compliant by telephone interview.

Phase III

Of 11 community pharmacists selected for the trial, two pharmacists refused to participate due to time constraints and nine pharmacists agreed. Despite efforts to recruit patients, three of the nine pharmacists were unable to enroll any patients and none of the pharmacists could enroll the full 10 patients requested. A total of 29 patients were recruited by the six pharmacists. Pharmacists reported 10 days was insufficient time to recruit the 10 patients. Pharmacists also indicated a reluctance on the part of patients to use the system. Some patients could not be bothered, other patients reported having their own system. One patient "lives with someone who wouldn't want to see all her pills on that big thing". Other patients stated "I can look after my own pills". One pharmacist sensed that patients viewed the system as a negative sign to their cognitive abilities.

Pharmacists required an average of 25 minutes to complete the card and 20 minutes to counsel patients. The most common dosing times selected by pharmacists were meals and bedtime (20 patients) and actual times of day (eight patients). Auxiliary labels were used for 15 of the 29 cards and most commonly involved inhaler and ointment labels. Time to fill out the card and counsel patients was seen as a limiting factor of the system by five of the nine pharmacists. However, all six pharmacists who used the system and two pharmacists who were unable to recruit patients indicated they would continue to use the system for other select patients. They felt the system would especially useful for patients on multiple medications (more than three or four) and those patients with memory problems. The size of the card was seen as a limitation by three pharmacists and two pharmacists felt the need to refill the system on a daily basis could be a limitation for some patients. One pharmacist also commented on the problems which may arise if a patient purchases drugs at more than one pharmacy.

Of the 29 patients initiated on the system by pharmacists, only 26 could be contacted for a home visit and one patient did not meet the eligibility criteria. Of the 25 patients visited at home, 12 (48%) were using the card. There was no significant difference in the mean age (71±5 vs 75±8), proportion of females (4/12 vs 6/13), persons living alone (2/12 vs 5/13) and the mean number of drugs prescribed (7±2 vs 6±2) between those patients who were using the system at home visit versus those who were not. Although there was no significant difference in baseline or trial compliance between the two groups, compliance decreased significantly from baseline to trial for both users (105±66 to 74±81, $p<0.001$) and nonusers of the system (99±32 to 76±45, $p<0.0001$). In addition, while doing the pill counts, there were often more tablets in the container than the number of tablets indicated on the vial label. These findings suggest that comparing baseline compliance determined by medication refills to post intervention compliance by pill count does not accurately reflect adherence to the drug regimen. The impact of the system on drug compliance, therefore, could not be determined in this study.

Comments by all 25 patients about the system were generally favorable regardless of whether or not they were using the system at home visit. Most subjects thought the card was a "a great idea". They found it easy to read and a good reminder to take medications, especially for patients on several drugs. Two patients (one still in hospital at the time of the interview and one since discharged) were hospitalized and found the card useful to communicate their drug regimen to Emergency staff. Many patients found the card too large and cumbersome and several persons had suggestions to improve card design. Two patients did not like the one-day set up. One patient found the seven-day system more convenient while one spouse, caring for her husband found the one-day system unsafe since her husband would take all medications laid out at once. Other reasons provided by patients for not using the system at home visit included: the large size of the card, already having a "system" (one patient's system involved combining all drugs into one jar), "too much trouble", and "bothersome".

Of the 12 patients using the card, 10 filled their own system and for two patients, the spouse was completing the card. An equal proportion of patients filled the system in the morning as compared to evening or bedtime. All 12 of the patients could be contacted for the six-week telephone interview. Of these 12 patients, 10 were still using the system and reported satisfaction with the system. For one of the patients whose spouse was previously completing the card, the patient was now filling the system himself. One patient using the system took the card to her physician who immediately discontinued two medications and changed a third medication.

DISCUSSION

This project involved the development and testing of a medication reminder card system for older adults on complex drug regimens. The need for educational interventions such as this project has been recognized by the Surgeon General,[7] World Health Organization,[9] Gerontological Research Council of Ontario,[10] British Columbia Department of Mental Health,[11] National Council on patient Information and Education,[12] and several other organizations.

It is well understood that information alone will not bring about a behavioral change and that strategies aimed at changing attitudes and skills in medication taking, in addition to increasing knowledge about drugs need to be developed and tested. A recent review by Mullen, et al[13] found that interventions which are behaviorally-oriented (versus information based) and include individualized education or counselling are more effective than written materials alone in reducing drug errors. The National Council on Patient Information (NCPI) has reviewed existing educational interventions in the U.S. and has identified several "trends". Most of the programs have been produced by government or non-profit groups with minimal input from seniors. Most are aimed at the elderly themselves, some to health care providers but few to the informal level of care. The materials more commonly are either awareness raising or provide general information on proper medication taking as opposed to providing practical advice or tools to facilitate a behavior or attitude change. In addition, the existing materials address the needs of medium to high reading levels, few meet the needs of low literacy.[12]

A medication reminder card addresses several of these issues. A card provides a physical device or tool to encourage optimal drug taking behavior and facilitate communication regarding a current drug regimen to other health care providers. If properly designed, the card could be used by informal care providers as a guide in drug administration to patients who do not have the cognitive ability to take medications independently. A well designed card could also address the needs of low literacy.

Although 13 of 49 hospital pharmacy departments in Canada responding to our Phase I survey provided a medication reminder card to their elderly patients, none fulfilled our criteria for the "ideal" card. Problems identified by nurses using an existing card for their geriatric patients in a Self Medication Program also suggested the need for a system more appropriate for this population.

Several features not available in existing card systems are incorporated into the design of the new card. The card organizes medications by dosing times in contrast to most systems which are organized according to medications followed by a list of the times each medicine is to be taken. The card has space for a maximum of six drugs administered four times daily (although three smaller spaces provide additional dosing times, if necessary). The physical design of the card, therefore, promotes a review for drug interactions, drug duplication, and minimizing daily dosing frequency in an effort to simplify the drug regimen to make it "fit" onto the card. Tablets are glued next to the drug name and assist in tablet identification. The correct number of tablets are also glued next to the appropriate medicine vial to provide a pattern to follow when setting out the day's medications. An empty medicine

vial indicates that the drugs for that dosing time have been taken. This avoids the need to check off that medicines have been taken — a step which is often overlooked. Providing optional auxiliary picture labels for times of the day and various dosage forms (injectables, inhalers, ointment etc.) and using a minimum of written information in large print also makes the system useful for the illiterate or non-English speaking. As recommended by the NCPI, input from seniors was solicited at all stages of system development and testing to ensure the card addressd at least some of their needs.

During this project, the medication reminder card was tested in 16 institutionalized and 29 ambulatory elderly patients on complex drug regimens. Over 75 percent of patients continued to use the system two weeks post enrollment and a majority of patients in the Phase III trial were still using the system after six weeks. This suggests that although the card may not be useful in all patients, it facilitates drug taking in select elderly persons on chronic, stable complex drug regimens. In addition to organizing medicines and providing a reminder for patients to take their drugs, the card was used to communicate the current drug regimen to other health care professionals. In general, patients found the card easy to read and the system easy to understand.

Community pharmacists felt the card was especially useful for patients of all ages on multiple medications or patients with memory problems. Time constraints were an expected finding in the Phase III trial although eight of nine pharmacists indicated they would continue to use the card for select patients. What appeared to be an

Appendix I: Criteria for the "Ideal" Medication Reminder Card

1. A minimum of information should be written on the card using "readable" print (large lettering, black on white, simple terms).
2. Simple drug regimens should be promoted by the system. For most drugs, dosing frequency need not exceed QUID and dosing times can correspond with meals and/or bedtime.
3. The system should be flexible to allow for individualized dosing schedules.
4. Symbols should be available for non-English speaking elderly or those who are illiterate.
5. The card should illustrate which drugs are to be taken at specific dosing times and provide a reliable method to indicate that the drugs have been taken.

Appendix II: Calculations for Compliance at Baseline and During Use of Medication Reminder Card

$$\text{COMPLIANCE} = \frac{A}{B} \times 100$$

I **BASELINE COMPLIANCE**
A = N1 + N2 + N3 + N4 ..... (IN Y DAYS)
B = F X Y

II **COMPLIANCE DURING TRIAL**
a) PRESCRIPTION FILLED BEFORE ENROLLMENT DATE
A = N1 - (D x F x BASELINE COMPLIANCE) - P
B = F x E
b) PRESCRIPTION FILLED ON ENROLLMENT DATE
A = N1 - P
B = F x E
c) PRESCRIPTION FILLED AFTER ENROLLMENT DATE
A = N2 - (D x F x BASELINE COMPLIANCE) + N1 - P
B = F x E

A = number of tablets actually taken
B = number of tablets that should have been taken
F = prescribed daily dosing frequency
N1 = quantity dispensed at last refill
N2 = quantity dispensed at second to last refill (etc.)
Y = numbers of days from date of first fill to date of last refill (between June/88 to June/89)
D = number of days from date dispensed to enrollment date
E = number of days from enrollment date to home visit date
P = number of tablets as determined by pill count

even greater obstacle was patients' reluctance to use the system. One pharmacist speculated that several patients considered memory aids to be suggestive of declining mental function and refused to adopt a system on this basis. Pharmacists need to reinforce the importance of adherence to prescribed drug regimens and the usefulness of a reliable system in ensuring proper drug taking behavior to their older patients, especially if noncompliance is suspected. Patients who indicate they already have a "system" should be informed of the availability of several "newer" systems to assist in drug taking. Public education advocating the use of compliance aids to help with drug taking for all patients on complex drug regimens should also be initiated.

A major limitation to the card design identified by both pharmacists and patients was its large, cumbersome size. The size of the card will be reduced and the card will be designed to lie flat or hang. To make the system more transportable, removable vials with lids will be incorporated into the card. The card will be changed to better accommodate an unstable drug regimen. Lastly, materials for the final card will need to be more durable than cardboard.

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