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MIAMI

Mrs. Yolanda Hall
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Dear Bobby,

Enclosed is a rough running draft of our minutes and conclusions. I have taken the liberty of circulating it to two or three other participants and I think I would like to forward all our comments to you for final editing.

I would be grateful for a copy of the Gas Company short form and for whatever materials you have from the Chicago Heart School Program.

Cordially,

Henry Blackburn, M.D.

Ask her for specific comments on computer programs?

HB:jp
enclosure

Survey Methods for Dietary Habits and Dietary Changes in Population Studies, Large Trials and Community Programs

Introduction:

A conversational review was undertaken by a small working group to determine the state of the art in assessing diet habits and eating patterns, and their changes, in population studies. Validation of existing methods were to be described along with validation desirable for proposed new methods. The working group also considered results of current assessments from intervention trials and need for diet data coding and computer analysis.

An introduction by Bobby Hall indicated her evaluation that there has been little fundamental progress in the methodology in the last two decades despite various improvements of concepts and techniques. She referred to the last succinct review of dietary surveys for cardiovascular studies made in 1967 and published in the W.H.O. Manual on Cardiovascular Survey Methods. The suggestion was made that this is an appropriate time to update that review, prepared by Hall and Mojonnier.

Bobby Hall indicated that appropriate measuring tools relate to
1) the dietary data desired
2) the composition of the population surveyed
3) the purpose of the survey
4) the range of variation in dietary habits within the population
5) the hypothesis being tested, and
6) the actual distribution of diet habits and food composition in the populations of interest.

A listing of the measurement tools which have been used include:
1) Dietary recall – 24-hour, 3 day, or 7 day,based on self-administered or interviewer administered diaries
2) Food diaries and eating pattern assessments
3) measured diets
4) chemical analyses of measured diets
5) home consumption surveys
6) spouse surveys
7) market basket surveys
8) indirect and unobtrusive measurements of marketing practices

Bobby Hall reviewed her personal experience with Chicago Prevention Education Program and Nutrition Education Program.

Validation of recall methods was made predominantly by a) cross-validation with other recalls of different duration, b) tests of "reasonableness" involving a rule of thumb of 12 calories per pound.

in CPEP

Experience ᵣrevealed the following: In a prevention program reports of calorie intake drop immediately presumably due to the new diet prescription and to the act of recording experience and   due to sensitization to information about appropriate foods, size of meat cuts, etc. Men report fewer calories than the wife reports they're eating. These factors exist despite the fact that no strong motivation to misrepresent intake existed in the CPEP study. The obese system-atically underestimate their intake. Recall of total calories is not significantly different from or less variable between four seasonal reports and one cross-sectional value.

Food group data, in contrast to individual nutrients, was considered to be a sensitive way of tracking change and whether intervention objectives were being reached. Bobby Hall gave data on percent changes in food groups in the CPEP as follows: Total calories 2341, follow-up 1730; low fat dairy products 2.3, follow-up 5.7; medium fat dairy products 4.7, follow-up 1.8; high-fat dairy products 3.8, follow-up 1.6.

maybe so in the context of active recommendation for AHA prudent diet.

Bobby Hall suggested that certain foods and food groups were reliable as indices of the overall adherence to a prudent diet recommendation, including eggs, bacon, and fish.

It is her impression that food records work in individuals with a 6th grade education on up. */My impression also with "slower" MRFIT men - a little hand holding is necessary, but they do an explicit job such as filling out records quite well.*
Food pattern questionnaires were reliable when the characterizations were no more than three defined classes, such as regular, occasional, and never used.

Bobby Hall remarked that the MRFIT food questionnaire is untested for relia-bility. Bobby Hall remarked that obtaining information on % of calories is better than actual grams which is one of the "problems" with the Stanford data. *% of calories is suggested as important for other fat and dietary cholesterol in the Keys' formulation.*
Data were summarized suggesting an overall population change in nutrient consumption between the Framingham study, Diet-Heart Study, NEP study and the MRFIT.

	Framingham '68	Diet-Heart '62	MRFIT '74	NEP '74
Number	864	1196	2110	
Diet calories	2608	2565	2437	3350
CHO	38.6%		37.5%	
Alcohol	6.7%	4.1%	7.7%	
Diet Chol.	530	533	446	556
Total fat %	39	40	38	42.5%
SF %	15	17	14	15
MF %	-	18	15	
PF %	5.4%	5.2%	6.5%	6.5%
B score	25	27	22	

pattern

The significance of this table is great in terms of the present trials and
community experience. Despite the uncontrolled nature of the data there is a
strong suggestion that the habitual dietary of adult volunteers *to* prevention
programs has significantly shifted in the last 15 years toward a lower fat
intake, lower saturated fat, slightly higher poly intake, slightly lower chol-
esterol intake. Estimations from the Minnesota B score values are given in
the Table which suggests that something on the order of a 5% decrease in serum
cholesterol values might be anticipated as a result of the recorded dietary
changes.

Bobby Hall also reported on the NEP experience in Chicago and suggested that
minority populations knew less about the prudent diet at entry, had higher
levels of saturated fat and cholesterol intake, but demonstrated a greater
intervention effect in the program.

Not clear what is being correlated with what here.

David Jacobs discussed the effect of regression toward the mean in MRFIT
serum cholesterol changes and presented results of the Minnesota study indicating
that a dietary achievement score correlated significantly (on the order of .4
to .5) with changes in the recorded food intake on 24 hour and 3-day recalls.
Bobby Hall reported the correlation between an average of 5, 24-hour recalls
and two food records, versus the dietary achievement score, was on the order
of .75. David Jacobs reported on a literature review, a bibliography of which
is attached. Further discussion is needed on the data of Harold Kahn from Israel
in which estimates of the true mean and variance were obtained from repeated
random measures of dietary recall data. This approach should vastly increase
the precision of population estimates and might result in useful data from
individual dietary assessments.

Bobby Hall speculated on the innovation of taking dietary recall data by
telephone, using trained interviewers and participants. The advantages would
be the random and surprise nature of the survey, the details on bag lunch
carrying habits, details on the last meal eaten out, and the most recent meal,
and the ability to look up brand names and details by the housewife in the
household surveyed. She reported that random postal surveys 12 times a year in
the NEP group resulted in only 50% response, and that the food pattern ques-
tionnaire was unreliable.

concurrent changes in   *changes in*

Dave Jacobs reports that the poor correlation between B scores developed
from food pattern questionnaires, and serum cholesterol levels, is probably
due to the absence of details on portion size. He reported data on the MRFIT
diet change questionnaire derived from the Stamler-Mojonnier-Gorder questionnaire,
scored with a Jacobs 4-class score based on nine food categories. A measure-
ment of dietary change with such a questionnaire correlated highly with serum
cholesterol change. He reported that the Pittsburgh group under Kuller found *a similar*
a less significant correlation. He suggested that change questionnaires may
be more revealing than simple subtraction of intervention from baseline recall
values. *, but found that the magnitude of this correlation diminished after adjustment for initial level of serum cholesterol.*

even after adjustment for initial cholesterol level. serum.

Mike Stern from Stanford presented results on a precoded food pattern ques-

tionnaire used in a sample of 1500 men and women aged 35 to 54 in the Three Communities study. The questionnaire was concerned with frequency and amount of fats, including major categories of fat, sugars, salt and alcohol intake. The 42 item questionnaire treated all meats as having equivalent composition values. Compromises in this questionnaire were due to the large sample size and the necessity for rapid individual assessment of the eating pattern amongst many other questionnaires. It was administered by a community person trained on one occasion in asking the questions from a larger questionnaire which also contained information on food attitudes and knowledge.

The results indicated that the eating pattern was not different in the high risk factor subsamples and in the rest of the subsamples of one experimental community Watsonville.

The results indicated a decrease in intake of dietary cholesterol, saturated fat and P/S ratio in the intervention towns. Weight loss occurred only in the intensive intervention group in Watsonville. Serum cholesterol values fell significantly in the media intervention communities.

Validation studies by Dr. Stern are enclosed in a table and the reported dietary change in the short form correlated with the serum cholesterol fall. Estimated corrections were made for an upright-recumbent position difference between the follow-up visits.

David Jacobs presented data on Minnesota and MRFIT studies with the theme that any dietary recall or questionnaire method should be found to relate, at least in terms of fat composition, to estimated cholesterol changes according to the formula of Keys and the Minnesota group.

Study on the effect of two months intervention in the intensive phase of MRFIT among 91 special care participants indicated a correlation between a change in Minnesota B-score and change in measured serum cholesterol. With Despite a significant correlation on the order of .4, .5 the cholesterol fall was only 35 to equal to 40% of the estimated fall, whereas in the Diet-Heart Study a more rigid intervention procedure resulted in 50% of the estimated effect and in Faribault, a closed population study, 80%.

In a multivariate analysis not only a change in the Minnesota B score but change in weight and baseline serum cholesterol were significant independent contributors to the prediction of cholesterol change. After adjustment for these factors the serum cholesterol fall was 35% of that estimated by the change in B-score.

Dr. Jacobs pointed out significant improvements in the recent period in the use of dietary recall methods which now involve training and certification of the interviewers, the use of food models and improvement in probing questions.

Bobby Hall pointed out that actual behavior and distribution of nutrient intake in a population should be ascertained by pretests for proper design of diet assessments.

Bobby Hall pointed out that the U.S. Department of Agriculture household food surveys based on home interviews are available at ten year intervals and the '75 data will soon become available. She suggested that we should build on these older home economics strategies.

Bobby Hall reviewed tables of food consumption compiled by Gqrtner in the Cancer Research Journal of November 1975 suggesting an increase in 50% in saturated fat intake. This is a combined result of an increase from 1909 to 1974 from 50 grams to 56 grams with corresponding decrease in total calories.

Dr. Blackburn reviewed the ways in which diets were measured and collected for chemical analysis in randomly sampled households of the 7 Countries study. Suggestion was made that this should be one of the standard procedures for cross-validation of wider questionnaire methods, and that such undertakings might still be appropriate to MRFIT, i.e., random samples, including individuals on blood pressure medications. These approaches have the advantages of precision and elimination of errors due to defects in food tables and coding bias. They have the disadvantage of the small samples represented.

Dr. Jacobs mentioned that all long term trials should have on-going revalidation procedures because of potential changes in the relationship of the reporting of food patterns and intake, and the actual intake.

Diane Corder reported on the collection of dietary information by 24-hour recall, performed in a standard fashion by trained and certified nutritionist interviewers in the MRFIT study, at the outset and at annual examinations. Advantages are: large sample size, centralized coding, centralized contacts between the nutritional coding center and food companies on composition. Disadvantages include the problem of eating out, in which sources of fat cannot be conveniently ascertained, and that peripheral center coding may be more valid in terms of cases with missing information. Coding rules tend to err on the high side in regard to saturated fat, in that at the first interview individuals are unfamiliar with food composition information. It was suggested that phone recalls might be helpful as well as improvements in consumer knowledge and labeling.

Trish Ashman indicated that a crucial item of documentation and long-term studies in the community was to monitor price changes for food groups. Bobby Hall indicated that Washington programs on food price and food practice monitoring were underway (the source of information is Jeanne Tillotson) as well as the Baylor group (Tony Giotto) and by Ruth Johnson from Los Angeles who is monitoring the cost of the MRFIT prudent diet.

Irving Pflug presented information on the use of computerized food tables containing composition and Minnesota B score computations as an educational tool in nutrition students. It sounded very effective in them, but less so in adults. Existing computer data banks were described including perhaps the most updated one with respect to fat composition, i.e., the Nutrition Coding Center of MRFIT-LRC, as well as those of the CPEP and the Pflug programs.

The general opinion was expressed that in order to effectively code dietary intakes and analyze them there must be a computer program, as the cumbersomeness of manual methods was prohibitive. Estimates of 10 to 20 minutes were given for coding time for individual 24-hour recalls.

Dr. Vince Hegarty reported on the NCC operation and indicated that continuous up-dating of fat composition would be possible due to the work of Kent Stewart at the Nutrition Composition Laboratory in the East and that he was developing information on detailed coding of carbohydrates and sugars. He indicated that coding of anything other than crude fiber was not yet realistic. He has recommended to the Joint Executive Board of the Nutrition Coding Center to compare predicted food composition with chemical analyses, but that this is not being carried out.

Dr. Hegarty indicated that decisions on the availability of computer coding and analytical services from the NCC would be determined by the JEB and Bethesda, but that for the next period of at least a year they had other more immediate priorities than offering services to outside NIH projects.

Trish Ashman summarized current results of dietary recall analyses from baseline and first annual examinations which suggest that MRFIT intervention has come close to its goals in saturated fat reduction and dietary cholesterol but short of its goals in increasing polyunsaturate consumption. Dr. Jacobs made computations indicating that little further improvement might be anticipated from a diet cholesterol component, but slight further improvement might be anticipated from saturated fat reduction and poly increase.

Manual coding of 24 hour recalls or 3 day food records may be the most efficient method if interest is limited to B-scores, for instance. The expense rapidly becomes prohibitive as the scope of the coding is expanded. The usefulness of A computer coding system, which will in any case be expensive, becomes useful when such a broader scope, highly detailed, analysis is required. Any computer coding system will be difficult to implement and maintain.

Conclusions:

1) The 24-hour recall method has become the standard method for dietary assessment in population studies, by usage, but is by no means the sole or ideal method for current or future studies.

2) Food or eating pattern questionnaires are not yet standardized and frequency of intake of food items are poorly validated data.

3) Nevertheless a wider picture of food pattern is required, over and above recall information.

4) Measurement of dietary change provides information probably complementary to cross sectional analyses and change measures are perhaps more valid measures than simple subtraction of serial recall data.

5) Validation of recall methods indicates adequate validity for population studies when chemical analyses are the reference, though there is a systematic underestimate of calorie intake.

6) Older and newer questionnaire methods of dietary assessment might best be validated against non-questionnaire references including chemical analyses, household consumption interviews, and market basket surveys.

Questionnaires would best be validated, in general, and as a first approach, using chemical analysis of measured diets in closed populations. New questionnaires should next be validated similarly with chemical analyses of measured diets but in free-living populations.

7) Home consumption surveys, measured diets and chemical analyses may produce valid characterization of population change, helpful validation of wider applied questionnaire methods, and they are feasible in small sub-samples of larger studies.

8) An updating of the 1967 survey of diet-survey methods by Mojonnier and Hall (in Rose & Blackburn) is in order.

9) Dietary change measures correlate significantly with cholesterol change though they overestimate the change, according to current studies reported from Minneapolis, Stanford and Boston.

10) Food group change data may be a sensitive way of tracking whether behavioral objectives of intervention are being met.

11) A few foods and food groups may be appropriate indices to wider community changes.

12) On-going revalidation of 24 hour recalls and food pattern interviews, is needed in long term population studies, as a continuing quality control measure.

13) Unobtrusive measurements involving marketing surveys provide complementary information on community change and should be tested and exploited.

14) The Minnesota B score provides a useful reference for translation of questionnaire data for comparison with measured serum cholesterol changes.

15) Questionnaires on eating pattern change may be most important early in studies -- while 24 hour recall and short form pattern questionnaires may be desirable for long-term community trends.

16) A central facility such as the NCC with updated food composition tables and automated processing is a national need for continued analysis of preventive trial data and community trends.

17) Minnesota B scores, baseline serum cholesterol, remote and recent weight change, all independently influence observed serum cholesterol change in ongoing trials.

18) Population-specific information on dietary composition and eating patterns is necessary to the proper collection of data, choice of measurement tools and intervention planning.

19) On-going funding for methodological studies in dietary surveys is needed.

20) Diet and nutrition surveys should be added to the National Health Survey.

21) Simultaneous monitoring of population health behavior, including eating pattern, measured risk factor change, and morbidity and mortality data are required for more effective interpretation of trends in vital statistics.

22) On-going analysis of cost of foods in programs of prudent dietary recommendations is needed.

23) Cholesterol change prediction equations are needed for non-isocaloric experimental conditions.

24) Future discussions of interested parties are recommended for the purpose of a) providing recommendations for improving dietary assessments in population studies, trials and community programs sponsored by federal agencies; b) providing programs of interdisciplinary training in dietary assessment; c) recommending specific studies needed for improved methodology, and d) wider comprehension of the effects of nutritional intervention and on-going socio-cultural changes.

25) Support for research on appropriate change statistics is desirable.

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