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ofe. *Accident Analysis and Preven-*
al meetings of the American Public

e injury severity score: a method for
rating emergency care. *Journal of*

tle bill' legislation on the incidence
Health, 1986, 76, 1243-1244.

nd emergencies. *Connecticut Medi-*

ournal of Safety Research, 1970, 2,

ing on crash fatalities in 1995, *The*
(3):1-5, Ann Arbor, MI: Highway

. 1985 Revision. Arlington Heights,
35.

rovement Meetings. Sacramento,

d States, *New England Journal of*

and Related Geometrics (90-39).

ederal-aid highway program of the
ts. Washington: U.S. Government

nses by enforcement of the existing
78, 67-77.

1969-1976. *South African Medical*

of bicycle-automobile accidents in
71-179.

as an alcohol countermeasure for
lge lines. *Transportation Research*

Trauma, 1977, 17, 898-902.

the American Medical Association,

l of the American Medical Associa-

entation of Trauma, Lexington, MA:

ervices: The other Pickwickian sym-
mber 1977, 1(3), 31-35.

s of owners, patterns of use and in-
-223.

ard modification. *Traffic Engineer-*

f signal timing on traffic flow and
rb Record, 1985, 1010, 1-8.

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Factors Related to Dietary Status of Limited Resource Farm
Families: A Case Study

Current Research in Rural Health

Factors Related to Dietary Status of Limited Resource Farm Families: A Case Study*

Ann A. Hertzler, John S. Caldwell and Miew Leng Mark-Teo

ABSTRACT: A case study approach was used to study 10 limited resource farm families to identify factors relative to the farm family situation that are associated with adequate or inadequate food habits. Dietary measures were developed and adequacy of diets was analyzed in relation to gender, women's off- or on-farm employment, predominant farm activities, and cohesiveness. Traditional families, with two adults present and the women employed on the farm, had the most adequate diets and higher cohesiveness ratings. Families in transition, with women employed off the farm or headed by widowed women farmers, had the poorest diets nutritionally and tended to have lower cohesiveness ratings. The presence of a food source raised or grown for income purposes did not guarantee the use of the food for family consumption.

A current research issue for nutritionists and social scientists is how the family situation influences eating behaviors and the quality of life (Hertzler and Owen, 1976; 1984). This same concern is occurring in farming systems and in other agricultural development programs targeted at farm families to improve production and income (Caldwell, Smith, Karaginis and Harris, 1983; Frankenburg, 1984; Hudgens, 1984). Providing information to make nutritious food choices and/or to increase agricultural income often does not result in improved health and well being (Caldwell et al., 1983; Hertzler & Owen, 1976; Smith, 1984; Todhunter, 1969).

The purpose of this paper is to use a case study approach in studying limited resource farm family units to identify family factors relative to the farm situation that are associated with adequate or inadequate food habits and, therefore, ultimate health and wellness. Studying family units in the same income group and agro-ecological zone provides the opportunity to develop measures to determine priorities for testing interventions for families on small farms and provides a model for studying family wellness (Hertzler and Owen, 1984). The value of the case study approach is the op-

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portunity to explore and quantify priority elements of the larger sample in the informal survey (Hart, 1983). This procedure can suggest directions for future work and, in this instance, adds the dimension of the family system to a study of the agricultural system.

Methodology

Sample Population. A research project using a modified "sondeo" technique (Shaner, Phillip, and Schmehl, 1982) was designed to study agrosocio-economic conditions to be considered in program modifications for a small farm agricultural extension program (Caldwell et al., 1983). The "sondeo" is an informal, multidisciplinary team reconnaissance survey. Its objectives are to characterize farming systems in an area, group farms into "recommendation domains" (Harrington and Tripp, 1984), and identify applied research priorities. The interview technique for this sondeo followed the "interview guide" approach of Patton (1980) rather than the "blank mind" approach (Shaner et al., 1982).

Forty-seven limited resource farm families living in a three county area of Virginia were studied. Both "limited resource" and "farm" were determined empirically by extension personnel on the multidisciplinary team. "Limited resource" was based on farm size, the area of crop land, the size of the cattle herd, and/or the cash flow status of the family as estimated by extension personnel. Average farm size in the three counties was 36 (Lee), 38 (Washington), and 56 (Smyth) hectares, respectively. Farm size on 47% of the sample farms was 40 hectares or less, 28% had 40-80 hectares, and 26% had more than 80 hectares. These figures are deceptive, however, as over half (56%) of the 4,276 farms in the three counties had harvested cropland area of less than 4 hectares. Most "farm" land area was wooded and largely unusable. "Farm" meant that the family produced and sold agricultural products on a regular basis as a major component of family income (Karagianis, Caldwell, and Harris, 1982; U.S. Department of Commerce, Bureau of the Census, 1981). The multidisciplinary team selected a non-random sample of ten families from the larger sample for a more intensive case study of dietary status and family factors. These families were selected to represent women's on/off farm employment and predominant farm activity (e.g., beef cattle; dairy; corn; and fruit and vegetable crops).

Of the ten families, eight families had two adults present. Of these, seven couples were married and one family was an extended family comprised of a father-in-law and a daughter-in-law with no husband present. The two female headed households were widows who farmed alone. Of the eight families with both a man and woman, all of the men listed the farm as their full time employment, but half of the women worked off the farm in full time salaried positions. All families had home gardens. The ages of the adults ranged from 27 to 54 years.

Dietary Status. Dietary information was collected for three different days over a two month period from each of the adults in the study. A 24-

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hour recall was used on the first day to obtain diet information for that day. It also served as a means to teach each participant how to use the record sheets to describe food and serving sizes for two additional specified 24-hour periods during week days corresponding to the recording of time diaries.

A research associate was trained by the dietary investigator to obtain the initial dietary record because of her already established rapport with respondents and because her horticulture training and her cultural background made her aware of food items consumed in the geographic area. The dietary investigator provided literature and discussions on interviewing protocol and cooking terms familiar to the geographic area, and used role playing with an experienced professional nutritionist and registered dietitian to check the techniques of the interviewer. A "decision tree format" (Table 1) was used as probing questions to avoid mentioning specific foods that might influence the respondents to report foods which were not actually being consumed (Raab, C., personal communication, January 11, 1982).

A validated record procedure was designed to collect dietary information from families (Mark-Teo, 1983). Although three dimensional food models improve the accuracy of reporting serving sizes (Moore, Judlin, and Kennemur, 1967), providing sets for each family is costly, and the number of food items represented are limited. Therefore, a code sheet was designed illustrating shapes (e.g. round, square, wedge, and miscellaneous) and thickness (Hertzler, 1981; Johnson, Nitzki, and Vanderburg, 1974). Adults were trained to use the code sheet to record serving sizes on the food record. After the dietary records were collected at the end of the two month period, the dietary investigator visited with individual families to clarify ambiguity or omissions. The dietary investigator translated foods and serving sizes into codes for computer analysis using a national data base of the nutritive values of foods (U.S. Department of Agriculture, 1978).

Dietary assessment was based on the Recommended Dietary Allowances (RDA) of eight nutrients: protein, calcium, iron, Vitamin A, thiamin, riboflavin, niacin, and Vitamin C. Calories were not considered because calories are the most difficult for which to obtain accurate dietary information and because energy recommendations represent average needs based on variability of individuals and on physical activity (Food and Nutrition Board, 1980; Light and Cronin, 1981; Young, 1960).

Average nutrient intakes were translated into percent RDA in order to compare nutrient values of different magnitude (e.g., milligrams iron, grams protein and International Units of Vitamin A) for specific age and sex categories (Food and Nutrition Board, 1980). RDAs meet the needs of approximately 98 percent of healthy individuals and therefore exceed requirements of most individuals (Food and Nutrition Board, 1980; Hegsted, 1978). Two-thirds of the RDA was selected as a level to evaluate the dietary status of this population (Food and Nutrition Board, 1980) because values below this level alert the researcher to potential dietary problems and populations at-risk (Guthrie and Scheer, 1981; Robinson, 1978). Although RDAs are not intended to evaluate individual diets, as the intake of a nutrient becomes increasingly low, the risk of nutritional problems in-

Table 1: Decision Tree Format for Probing Questions for Dietary Information.

Ingredients	Accompaniments (dressings, toppings, seasonings)	Method of Preparation	Quantity Consumed (use with visuals)
<ol style="list-style-type: none"> 1. What did you put in that dish or what was put in the dish? 2. What else did you add? 3. Was it made from scratch? 4. Did you use a mix/package/can/frozen ingredients? 5. What brand did you use? 6. Can I see/have the label? 7. What did you add to your gravy, sauce, soup? (any seasonings, fat, sugar, milk, drippings, etc.?) 8. What greens (type) did you use? List. 9. What fat/oil/grease was used in preparing the dish? or Can you show/give the brand label? or What type of margarine/butter/lard did you put in to the dish? 10. If milk was used, what type was it? (1/2%, 2%, whole milk, evaporated, etc.) Give brand name if possible. 	<ol style="list-style-type: none"> 1. What did you put on the food or did you put anything on the food? (e.g. butter, cream, ketchup, mustard, etc.) 2. Was the dressing/topping/seasoning/garnish homemade or commercial? 3. If commercial, what was the brand name? 4. If homemade, what things were used? 5. Did you add anything (sugar, cream, lemon, etc.) to your coffee/tea/chocolate? 6. What did you use for filling (sandwich, pie, etc.)? List. 7. Did you garnish your food? and What did you use? 8. Did you have a topping/sauce (etc.) on your dessert? If yes, what? 	<ol style="list-style-type: none"> 1. How was it prepared or cooked? 2. Was it eaten raw, boiled, steamed, stewed, grilled, baked, deep fried? 3. If deep fried, what fat/grease did you use? 4. What brand name of fat/grease did you use? 5. What brand name of margarine/butter/lard etc. did you use? 6. How was the dish (gravy, sauce, soup) thickened? 7. Did you add anything else? 	<ol style="list-style-type: none"> 1. How much did you eat or drink? (Indicate from visuals) 2. What was the shape? (Estimate) (Indicate from visuals) 3. What was the size? (Indicate from visuals) 4. How thick? (Indicate from visuals)

creases. An overall dietary score was calculated based on the number of the eight nutrients meeting the RDA (Guthrie and Scheer, 1977). *Family Cohesiveness.* The subjects were instructed to complete nine diaries of Robinsion (1977) a procedure of Robinsion (1977) a sampling of all days of the week assigned evenly over the day. Five time diaries of each participant were used to study family cooperation. The eighth two-adult family did not participate in the study as the families had only one adult.

Joint activities are thought to be a reflection of cooperation, concern, enjoyment and trust (Davey and Paul, 1952). These attributes could be used to measure the extent to which the family members participated in each set of time diaries as a measure of family cohesiveness — an indicator of family cohesiveness.

Activity Score. Time spent together working (Patton, 1980). Assumption was made that every fifteen minutes that the subjects spent together working

Activity Quality Score. This score reflects the degree of interaction between the subjects spent together working (e.g. more interaction than watching television). There is a greater probability of interaction in order to get the job done. Activities were categorized into six groups: (1) television/news, (2) shopping, (3) visiting, (4) reunion, (5) fishing, (6) shopping; and (6) invited guests. The subjects were examined to discuss the time spent together working multiplied by the assigned quality score to provide the Activity Quality Score.

Results and Discussion

The average nutrient intake for both men and women are presented in Table 2. *Dietary Status: Women.* The most adequate of nutrients (I

<p>etc. and you use:</p>	<p>6. How was the dish (gravy, sauce, soup) thickened?</p> <p>7. Did you add anything else?</p>
<p>o. What did you use for mixing (sauces, pie, etc.)? List.</p>	<p>7. Did you garnish your food? and What did you use?</p> <p>8. Did you have a topping/sauce (etc.) on your dessert? If yes, what?</p>
<p>sugar, milk, drippings, etc.)</p> <p>8. What greens (type) did you use? List.</p> <p>9. What fat/oil/grease was used in preparing the dish? or Can you show/- give the brand label? or What type of margarine/butter/lard did you put in to the dish?</p> <p>10. If milk was used, what type was it? (1/2%, 2%, whole milk, evaporated, etc.) Give brand name if possible.</p>	

creases. An overall dietary score was calculated for each adult by adding the number of the eight nutrients present with greater than 66 percent of the RDA (Guthrie and Scheer, 1981).

Family Cohesiveness. The participants, as part of the larger study, were instructed to complete nine 24-hour activity time diaries following the procedure of Robinson (1977) and Walker and Woods (1976). To assure equal sampling of all days of the week throughout the study, recording days were assigned evenly over the days of the week (Caldwell et al., 1983). The first five time diaries of each participant in seven families with two adults each were used to study family cohesiveness because of their completeness of information. The eighth two-adult family was not included because one partner did not participate in the time budget survey. The two remaining families had only one adult.

Joint activities are thought to reflect cohesiveness through agreement, cooperation, concern, enjoyment, affection, esteem, interest, confidence, and trust (Davey and Paolucci, 1980; Hertzler and Owen, 1976; Jansen, 1952). These attributes could be considered to be indirect measures of the extent to which the family members are supportive of each other. Shared activities in each set of time diaries were used to develop two indirect measures of family cohesiveness — an Activity Score and an Activity Quality Score.

Activity Score. Time records describe people's experiences in their own terms (Patton, 1980). Assuming that some form of interaction or communication occurred between the adults while together, one point was assigned to every fifteen minutes that the participants spent together in activities.

Activity Quality Score. An activity quality score was developed to reflect the degree of interaction and exchange of ideas. For example, time spent together working (e.g., farming or shopping) was assumed to involve more interaction than watching television or attending a movie together. There is a greater probability that ideas and methods are being shared in order to get the job done. Activities during "waking" time were identified and categorized into six groups according to levels of opportunity for communication: (1) television/movie; (2) church activities; (3) social activities (e.g., visiting, reunion, fishing, resting); (4) meals; (5) working (i.e., farming, shopping); and (6) involvement in another family member's interest (e.g., picture taking of spouse's art work). The time diaries of each two adults were examined to discern types of activities, length of time, and location where time was spent together. Each category in the activity score was multiplied by the assigned quality points (Table 2) and added together to provide the Activity Quality Score.

Results and Discussion

The average nutrient intake for the three day period and the diet scores for both men and women are shown in Table 3.

Dietary Status: Women. For the women, protein and niacin were the most adequate of nutrients (Table 3). Eight of the ten women had one and a

06	4	8	50	80	—	142	628
07	4	31	24	—	—	59	193
08	9	15	8	59	—	98	395

*Quality points are the numerical value placed on each activity.
 **Activity Score = 1 point was assigned to every 15 minutes that the participants spent together.
 ***Activity Quality Score = the number of points in each activity was multiplied by quality points.

Table 3: Percent RDA for Eight Nutrients for Women (n = 10) and Men (n = 8) by Family According to Off/On Farm Employment of the Women and Farming Activity.

WOMEN ON-FARM											
Family Number	Predominant Farming Activity	Protein	Calcium	Iron	Vitamin A	Thiamine	Riboflavin	Niacin	Vitamin C	Diet Score*	Actual Quality
05	W Beef Cattle	126	165	62	168	186	212	153	231	7	281
	M	103	141	118	120	123	133	110	229	8	
10	W Beef Cattle	220	73	97	327	110	120	191	380	8	
	M	—	—	—	—	—	—	—	—	—	
06	W Dairy	155	44	69	112	79	104	203	249	7	628
	M	247	116	223	74	185	177	193	232	8	
07	W Dairy	99	92	76	140	102	149	146	94	8	193
	M	227	196	236	235	161	236	207	204	8	
08	W Fruit and Vegetable	172	73	92	127	136	119	196	227	8	395
	M	146	72	145	150	124	101	172	411	8	
09	W Fruit and Vegetable	64	33	33	54	39	50	82	56	1	
	M	—	—	—	—	—	—	—	—	—	
WOMEN OFF-FARM											
03	W Beef Cattle	164	112	60	45	134	149	139	18	6	264
	M	185	79	175	85	141	120	139	280	8	
04	W Beef Cattle	111	42	78	51	59	74	139	127	5	337
	M	120	38	103	42	52	61	122	131	4	
02	W Dairy	136	15	28	20	38	49	215	88	3	115
	M	109	27	72	22	40	48	128	47	3	
01	W Corn	146	51	36	22	57	78	178	52	3	
	M	177	161	186	140	115	147	141	145	8	

*Number of eight nutrients for which at least 66% RDA was met.

half to two times the amount of protein recommended. This is consistent with American dietaries which typically have two to four times the recommended levels (Crocetti and Guthrie, 1982; U.S. Department of Health, Education, and Welfare, 1972).

Only five of the ten women met the standard of two-thirds RDA for calcium, iron, and Vitamin A; six for thiamin; seven for Vitamin C; and eight for riboflavin. Since milk products are a concentrated source of calcium, riboflavin, and Vitamin A, women deficient in riboflavin and Vitamin A were also low in calcium.

Iron is the one nutrient for which no woman met the 100 percent RDA level. Five women had intakes above two thirds RDA and three of the ten women had iron intakes in the twenty and thirty percent range. Although more nutritionally adequate diets tend to have higher iron content, iron is consistently limiting for populations with higher iron recommendations because few foods are concentrated iron sources (Guthrie and Scheer, 1981; King, Cohenour, Corruccini, and Schneeman, 1978; Raper, Rosenthal, and Woteki, 1985).

Dietary Status: Men. Although protein and niacin for all the men followed the same high levels as for women, iron intake was much better than for women. The fact that iron intake is adequate for all men is partially explained by a lower RDA and partly by the greater amounts of food usually consumed by men.

Six of the eight men had RDA ratings above two-thirds RDA for the nutrients measured. Lower nutrient intakes for the other two men were calcium, Vitamin A, thiamin, riboflavin, and Vitamin C. The lack of these nutrients suggests a limited intake of milk products and fruits and vegetables.

Dietary Status: On/Off Farm Employment of Women. In evaluating the dietary adequacy of the adult members of the families in this study, couples with women employed on-the-farm appeared to have more adequate diets than those with women employed off-the-farm (Table 3). All four of the women working off the farm had dietary intakes low in one or more nutrients. In this latter group two of the four men had evidence of dietary inadequacies. Dietary problems also occurred when the farmer was a widowed woman.

The findings for women employed off-the-farm are surprising since previous research results have suggested that involvement socially, in community activities, or in the work force often results in avenues to information resources (Jones and Rosenfeld, 1981). However, research has also indicated that women in the work force may have links to incorrect nutrition information through co-workers and media, especially in regard to current dieting interests (Hertzler and Shulman, 1983). Access to reliable food and nutrition information sources may also be limited because employment hours conflict with traditional women's afternoon meetings such as are typically held by agencies and organizations. Lastly, families with women employed off the farm may be limited in the amount of time they have to plan, shop,

and prepare meals for family (1986).

The data for the two widows indicate a trend of dependence showing that low-income women have more problems of handling family and managing household tasks. Traditional support to cope with dietary problems is limited.

Thus, problem diets appear to be associated with women moving out of the traditional role of the wife's role as defined as supporting farm activities. As women working off the farm appear to need food more, they may have a lower dietary status. Future studies should examine these limited resources for time management and food shopping hints) and also examine the transition to dual career families.

Dietary Status: Farm Activity. The availability of foods to provide adequate dietary adequacy by the four families in the sample and illustrate that, in this limit as beef cattle or dairy cattle, guarantee the use of that food for nutrition.

In families with beef cattle, several nutrients are of concern: Vitamin A, thiamin, riboflavin, and two of the women.

In the dairy group, half using an adequate amount of particularly low in key nutrients riboflavin. One other woman not included in the diet, or calcium levels are attained (Food).

The same observation vegetable farm activity category meet RDA standards (i.e., Vitamin C, Vitamin A, Vitamin E) by fruits and vegetables. Even in gardens, these nutrients were usually with a corn crop as its primary source. Several nutrients that were inadequate.

Analyzing diets by the type of farm activity and the availability of food does not always indicate that countries illustrate that technically result in more adequate

recommended. This is consistent
two to four times the recom-
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a meetings such as are typically
families with women employed
of time they have to plan, shop,

and prepare meals for family members (Hertzler, Robbins, and Walton, 1986).

The data for the two widowed farm women parallel other research evidence showing that low-income, single, female parents express pervasive problems of handling family finances, meeting children's needs, and coordinating household tasks. This group often feels isolated and lacking emotional support to cope with daily challenges (Gladow and Ray, 1984).

Thus, problem diets appear to be associated with farm families who are moving out of the traditional family pattern of this geographic area where the wife's role was defined as a full-time homemaker directly, and indirectly as supporting farm activities. In this study, limited resource farm families with women working off the farm and widows responsible for both farm and family appear to need food and nutrition information to improve their dietary status. Future studies need to consider the kinds of nutrition information these limited resource farm families in transition may need (e.g., time management and food preparation hints, or money management and food shopping hints) and also the potential channels to deliver such information to dual career families.

Dietary Status: Farm Activity. Farm activity could account for the availability of foods to provide necessary nutrients. Thus, Table 3 describes dietary adequacy by the four types of predominant farm activity represented by the families in the sample. Nutrient inadequacies occur in each group and illustrate that, in this limited study, the presence of a food source, such as beef cattle or dairy cattle, raised or grown for income purposes does not guarantee the use of that food (in this case beef or milk) for family consumption.

In families with beef cattle production, the most common farm activity, several nutrients are of concern in two of the four families — calcium, Vitamin A, thiamin, riboflavin, and Vitamin C. Iron intake is borderline for two of the women.

In the dairy group, half of the dairy farm family members were not using an adequate amount of milk. Both partners in one family were particularly low in key nutrients supplied by milk: calcium, Vitamin A, and riboflavin. One other woman was low in calcium. When milk products are not included in the diet, only about 25 percent of the recommended calcium levels are attained (Food and Nutrition Board, 1980).

The same observation occurs with families within the fruit and vegetable farm activity category. In those families, the nutrients that did not meet RDA standards (i.e., Vitamins A and C) are nutrients typically provided by fruits and vegetables. Even though all families in this study had home gardens, these nutrients were limited in several cases. Similarly, in the family with a corn crop as its main farming activity, the woman's diet had several nutrients that were inadequate.

Analyzing diets by the type of farm activity supports the premise that the availability of food does not guarantee its use. Projects in developing countries illustrate that technology and improved incomes do not automatically result in more adequate nourishment of family members (Fischer,

1978). Such programs also need to include information on making food choices for improving adequacy of diets.

Family Cohesiveness. Table 2 presents the Activity Scores for the seven families for which scores could be calculated. According to the distribution of points, two families could be considered to have low family cohesiveness (Nos. 2 & 7). Although no one activity predominated among the families, the two families rated low appeared to spend the least time working together (i.e., shopping and farming). The families with the low activity scores are the same families that had low activity quality scores. The findings illustrate that, according to measures in this study, these seven families do differ in both time spent together and in the quality of their interaction.

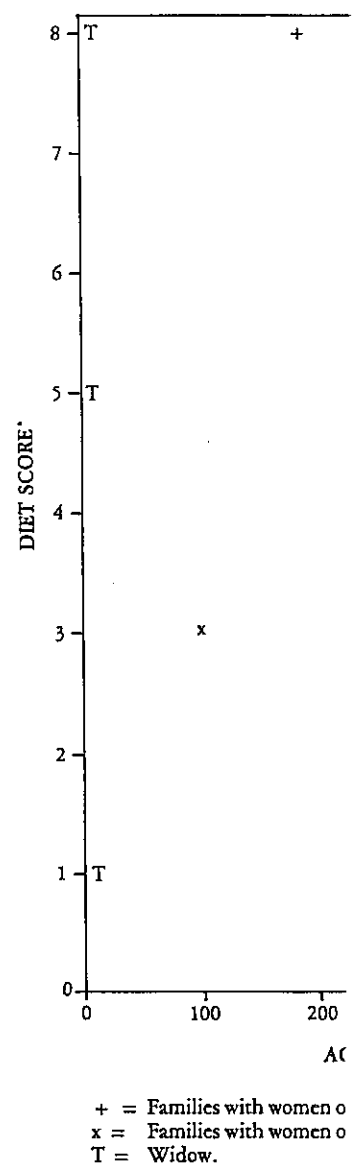
Several food habit studies (Allen, Patterson, and Warren, 1970; Hertzler and Owen, 1976; Hinton, Chadderton, Eppright, and Wollins, 1962) have measured family interaction by examining the meals the family members consumed together and/or other activities shared as a unit. Hertzler and Vaughan (1979) argued that time spent together in such events does not guarantee cohesive families with close relationships. However, other results suggest a positive relationship between dietary adequacy and cohesiveness measured as activities together. Davey and Paolucci (1980) used time to measure interaction and found that social activity combined with eating accounted for 75% of the interaction in the family. They concluded that time records could provide information for quantitatively measuring the amount of family interaction that took place within the family dwelling. The current study substantiates the proposition that time spent together does reflect differences in cohesiveness; but, reinforces the need for the further development and investigation of measures to reflect family dynamics.

Dietary Status: Cohesiveness. The results of the data relating dietary status to cohesiveness can best be visualized graphically by plotting the ratings for dietary adequacy and cohesiveness (Figure 1). The dietary scores of the husband and wife (Table 3) were averaged together as a Diet Score to reflect the dietary adequacy of the adult partners in the family. Since the two cohesiveness measures produced the same ratings, only the activity quality score was used to compare with dietary adequacy. Where families had only one adult, the single dietary score was used. For those families, cohesiveness among adult partners was defined to be zero, since there was only one adult present.

The results presented in Figure 1 indicate that families with the women employed on-the-farm tend to have the most adequate diets and the highest cohesiveness ratings. In contrast, families where the women were employed off-the-farm tend to have lower ratings for cohesiveness and dietary adequacy. Farm families headed by a single woman have diets ranging from low to high.

These findings support the proposition that measures of dietary adequacy and of cohesiveness represent separate dimensions of the family situation. Further, the findings illustrate factors that may serve as constraints or as a positive force in the family's use of information. Apparently, the off-farm employment of the women is associated with less adult communication time and with poorer dietary adequacy.

Figure 1. Comparison of Dietary Adequacy and Family Cohesiveness (Activity Quality Score)



*Number of eight nutrients
 **Number of 15 minute interactions

ade information on making food

s the Activity Scores for the seven ed. According to the distribution d to have low family cohesiveness redominated among the families, and the least time working together es with the low activity scores are ility scores. The findings illustrate these seven families do differ in y of their interaction.

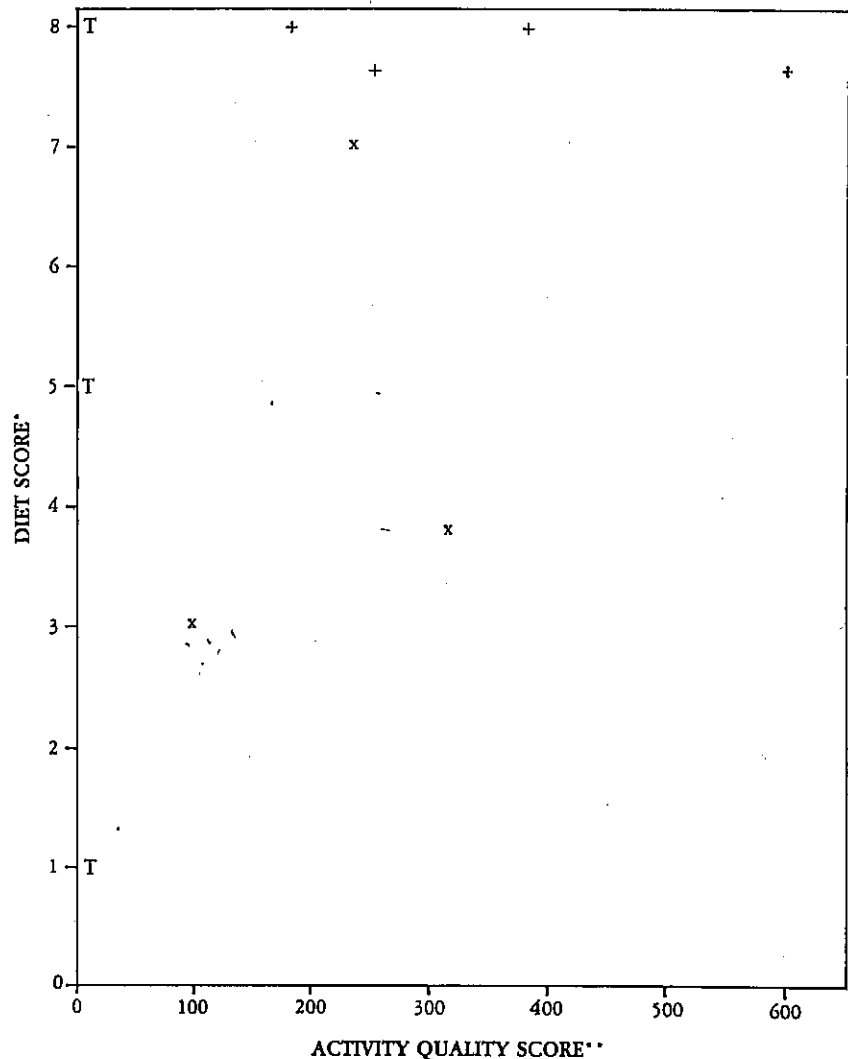
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Figure 1. Comparison of Dietary Adequacy (Diet Score) and Cohesiveness (Activity Quality Score) of Adult Partners.



- + = Families with women on farm.
- x = Families with women off farm.
- T = Widow.

* Number of eight nutrients for which 66% RDA was met.

** Number of 15 minute intervals spent together multiplied by quality points.

Summary and Implications

This study focused on limited resource families living on small farms, and participating in an agricultural extension program to improve production and income. The case study approach was used to study ten families from a larger sample to identify and analyze dietary practices in relation to farm family factors.

In this study, farm families with both a man and woman present and working on the farm have more adequate diets. They represent the traditional pattern where the wife is on the farm with the husband. Because of the higher cohesiveness ratings and better diets, families with these man-woman farm-family patterns appear to be more successful in providing nourishing foods. Their better diet scores may be explained by their cohesiveness and support systems within the family in order to make informed food decisions. This appears to correspond with other studies (Jones-Webb and Nickols, 1984) that have reported that families with the women on the farm have access to food and nutrition information which support them in their attempts to provide nourishing meals to fit the family life style.

Families in transition, with women employed off-the-farm or headed by a widowed woman farmer, have the poorest diets nutritionally and either lower cohesiveness ratings or the lack of another family adult with which to talk. The literature suggests that as the typical man-woman farm-family pattern changes in the community, new roles and responsibilities result in altered networks with information in the community and/or in variation in communication patterns within the family (Jones-Webb and Nickols, 1984). Family time constraints could either limit links with reliable information channels (e.g., afternoon meetings) or promote dependence on unreliable information (e.g., the media) (Hertzler and Schulman, 1983).

The results of this investigation illustrated that improved income does not necessarily result in improved nutrition and the presence of food for income purposes does not guarantee its use in family diets. Thus, findings suggest that families in transition, with one adult working off-the-farm, could benefit from food and nutrition information designed for their changing situation.

The case study approach, although confounded by family specific information, has great utility in providing quantitative data for in-depth analysis. More interdisciplinary efforts are needed to develop rapid, quantitative and qualitative measures of dietary adequacy, links with food and nutrition information, and the use of the information in the family system. Such an approach is necessary to assess factors which facilitate the family's use of information in enhancing their health and the quality of their lives and to design interventions that strengthens the family system (Hertzler and Vaughan, 1979; Axinn, 1981).

- Allen, D.E., Patterson, Z.J., and W. performance among high school
Axinn, N.W. "The Family Focus for
ray (Ed.), *Responding to the Ne-*
tucky State University, 1981, 53
Caldwell, J.S., Smith, M.F., Karagin:
Southwest Virginia: An apprc
research and extension. *Souther*
Crocetti, A.F. and Guthrie, H.A. 1
food consumption survey, 1977
ference, Washington, D.C., De
Davey, A.J. and Paolucci, B. *Family*
Relations, 1980, 29, 43-49.
Fischer, J.L. Summary Report on th
Proceedings and Papers of the
AZ: University of Arizona, 197
Food and Nutrition Board. *Recomm*
D.C.: National Academy of Sci
Frankenberger, T. Inclusion of food
presentation at the 1984 Ann
University, Manhattan, KS, Oc
Gladow, N.W. and Ray, M.P. Th
22(Sept./Oct.), 16-21.
Guthrie, H.A. and Scheer, J. C. *Vall*
nal of the American Dietetic As
Harrington, L.W. and Tripp, R.
research, Economics Program, 1
ico, (mimeo), 1984.
Hart, R.D. "An ecological systems
sion." In *Readings for Farming*
University of Florida, Farming
Hegsted, D.M. *Dietary Standards*,
13-21.
Hertzler, A.A. *The Four Food Grow*
ative Extension Service, Virgini
VA, 1981.
Hertzler, A.A. and Owen, C. *Socic*
accessibility and solidarity. *J*
381-384.
Hertzler, A.A. and Owen, C. *Cultu*
Journal of the American Dietetic
Hertzler, A.A., Robbins, J.C., and
workers. *Journal Nutrition Edu*
Hertzler, A.A. and Schulman, R.S.
the American Dietetic Associat
Hertzler, A.A. and Vaughn, C.E. T
tion. *Journal of the American l*
Hinton, M.A., Chadderton, H.,
behavior. *Journal of Home Eco*
Hudgens, R.E. Subregional issues i
tension methodology — a ca
Farming Systems Reseach Sym
1984.
Jansen, L.T. Measuring family solid
Johnson, N.E., Nitzke, S., and Va
Home Economics Research Jou
Jones, C. and Rosenfeld, R.A. *A*
Chicago, IL: National Opinion
Jones-Webb, J. and Nickols, S.Y.
sion, 1984, 22, 16-22.

REFERENCES

- Allen, D.E., Patterson, Z.J., and Warren, G.L. Nutrition, family commensality, and academic performance among high school youth. *Journal of Home Economics*, 1970, 62, 333-337.
- Axinn, N.W. "The Family Focus for Considering the Needs and Role of Women." In E. Murray (Ed.), *Responding to the Needs of Rural Women — Proceedings*. Frankfort, KY: Kentucky State University, 1981, 53-58.
- Caldwell, J.S., Smith, M.F., Karagianis, V., and Harris, R. Time use by small farm families in Southwest Virginia: An approach for the inclusion of household in farming systems research and extension. *Southern Rural Sociology*, 1983, 1, 25-53.
- Crocetti, A.F. and Guthrie, H.A. Nutrient quality of diets of respondents from nationwide food consumption survey, 1977-78. Paper presented at the 1983 Agriculture Outlook Conference, Washington, D.C., December 1982.
- Davey, A.J. and Paolucci, B. Family interaction: A study of shared time and activities. *Family Relations*, 1980, 29, 43-49.
- Fischer, J.L. Summary Report on the Conference on Women and Food. In A.B. Cavan (Ed.), *Proceedings and Papers of the International Conference on Women and Foods*, Tucson, AZ: University of Arizona, 1978, 4-19.
- Food and Nutrition Board. *Recommended Dietary Allowances: Ninth Edition*. Washington, D.C.: National Academy of Sciences, National Research Council, 1980.
- Frankenberger, T. Inclusion of food consumption concerns in farming systems project. Poster presentation at the 1984 Annual Farming Systems Research Symposium, Kansas State University, Manhattan, KS, Oct. 1984.
- Gladow, N.W. and Ray, M.P. The low income single parent. *Journal of Extension*, 1984, 22(Sept./Oct.), 16-21.
- Guthrie, H.A. and Scheer, J.C. Validity of a dietary score for assessing nutrient adequacy. *Journal of the American Dietetic Association*, 1981, 78, 240-245.
- Harrington, L.W. and Tripp, R. Recommendation domains: A framework for on-farm research. Economics Program, International Maize and Wheat Improvement Center, Mexico, (mimeo), 1984.
- Hart, R.D. "An ecological systems conceptual framework for agricultural research and extension." In *Readings for Farming Systems Research and Extension Methods*. Gainesville, FL: University of Florida, Farming Systems Support Project, 1984.
- Hegsted, D.M. Dietary Standards. *Journal of the American Dietetic Association*, 1975, 66, 13-21.
- Hertzler, A.A. *The Four Food Groups, Food for Fitness*, Publication 348-906, Virginia Cooperative Extension Service, Virginia Polytechnic Institute and State University, Blackburg, VA, 1981.
- Hertzler, A.A. and Owen, C. Sociologic study of food habits — A review. II. Differentiation, accessibility and solidarity. *Journal of the American Dietetic Association*, 1976, 69, 381-384.
- Hertzler, A.A. and Owen, C. Culture, families, and the change process — a system's approach. *Journal of the American Dietetic Association*, 1984, 84, 535-543.
- Hertzler, A.A., Robbins, J.C., and Walton, S.W. Assessing nutrition education needs of office workers. *Journal Nutrition Education*, 1986, 18, 207-210.
- Hertzler, A.A. and Schulman, R.S. Employed women, dieting, and support groups. *Journal of the American Dietetic Association*, 1983, 83 (No. 2), 153-158.
- Hertzler, A.A. and Vaughn, C.E. The relationship of family structure and interaction to nutrition. *Journal of the American Dietetic Association*, 1979, 74, 23-27.
- Hinton, M.A., Chadderdon, H., Eppright, E., and Wolins, L. Influence on girls' eating behavior. *Journal of Home Economics*, 1962, 54, 842-846.
- Hudgens, R.E. Subregional issues in the implementation of farming systems research and extension methodology — a case study in Zambia. Paper presented at the 1984 Annual Farming Systems Research Symposium, Kansas State University, Manhattan, KS, October, 1984.
- Jansen, L.T. Measuring family solidarity. *American Sociological Review*, 1952, 17, 727-733.
- Johnson, N.E., Nitzke, S., and Vanderburg, D.L. A reporting system for nutrient adequacy. *Home Economics Research Journal*, 1974, 2, 210-221.
- Jones, C. and Rosenfeld, R.A. *American Farm Women: Findings from a National Survey*, Chicago, IL: National Opinion Research Center, NORC Report No. 130, 1981.
- Jones-Webb, J. and Nickols, S.Y. Programming for modern farm women. *Journal of Extension*, 1984, 22, 16-22.

- Karagianis, V., Caldwell, J.S., and Harris, R.D. Southwest Virginia Farming Systems Research and Extension (FSR/E) Project Progress Report, Blacksburg, VA: Virginia Polytechnic Institute, 1982.
- King, J.C., Cohenour, S.H., Corruccini, C.G. and Schneeman, P. Evaluation and modification of the Basic Four Food Guide. *Journal of Nutrition Education*, 1978, 10 (1), 27-29.
- Light, L. and Cronin, F.J. Food guidance revisited. *Journal of Nutrition Education*, 1981, 13, 57-62.
- Mark-Teo, M.L. *Family cohesiveness and dietary status of farm families in Southwest Virginia*. Unpublished Masters thesis, Virginia Polytechnic Institute and State University, Blacksburg, VA, 1983.
- Moore, M.C., Judlin, B.C.; and Kennemur, P.M. Using food models in taking dietary histories. *Journal of the American Dietetic Association*, 1967, 5, 447-450.
- Patton, M.Q. *Qualitative Evaluation Methods*. Sage Publications: Beverly Hills, 1980.
- Raper, N.R.; Rosenthal, J.C. and Woteki, C.E. Estimates of available iron in diets of individuals 1 year old and older in the Nationwide Food Consumption Survey. *Journal of the American Dietetic Association*, 1985, 84, 783-787.
- Robinson, C.H. The dietitian's use of the RDAs. *Journal of the American Dietetic Association*, 1978, 73, 434-437.
- Robinson, J.P. *How Americans Use Time*. New York, NY: Praeger, 1977.
- Shaner, W.W., Philipp, P.F., and Schmehl, W.R. *Farming Systems Research and Development: Guidelines for Developing Countries*, Boulder, CO: Westview Press, 1982.
- Smith, M.F. Nutrition and farming systems research and extension. In C.B. Flora (Ed.) and P.P. Nichols (Compiler), *Proceedings of Kansas State University's 1983 Farming Systems Research Symposium: Animals in the Farming System*. Manhattan, KS: Kansas State University, 1984, 689-694.
- Todhunter, E.N. Approaches to nutrition education. *Journal of Nutrition Education*, 1969, 1, 8-9.
- U.S. Department of Agriculture. *Nutritive Value of Foods*. Washington, D.C.: Home and Garden Bulletin Number 72, 1978.
- U.S. Department of Commerce, Bureau of the Census, *Census of Agriculture*, Vol. 1, State and County Data. Part 46, Virginia. Washington, D.C., 1981.
- U.S. Department of Health, Education, and Welfare. *Highlights Ten-State Nutrition Survey 1968-70*. Washington, D.C.: Publication Number (HSM) 72-8134, Center for Disease Control, 1972.
- Walker, K.E. and Woods, M.E. *Time use: A measure of household production of family goods and services*. Washington, D.C.: American Home Economics Association, Center for the Family, 1976.
- Young, C.M. Methodology for dietary studies in epidemiological surveys, II — Strengths and weaknesses of existing methods. *American Journal of Public Health*, 1960, 50, 803-814.

Efficacy of System Management Options for Distressed Rural Hospitals

David E. Berry, Thomas Tucker, and Seavey

ABSTRACT: Systems linkage between rural hospitals and a multihospital system is being explored as a means of reducing the distress of small rural hospitals. This national study compared 194 independent systems-managed hospitals in relation to occupancy, financial performance, and staff morale. Almost no differences were found between the two groups. Distress was found to be less in systems-managed hospitals and less supportive environments were found in many of the advantages of systems management. A management contract is being used to solve the problems of a rural hospital.

Many small rural hospitals are finding their environments become more restrictive roles (A.M.A. News, 1983; Stumbo, and Harlan, 1983; K. health services continues to be less available than urban areas, large hospitals, and a sizeable number of unemployed and a sizeable number of unemployed (1985; Van Hook, 1985). The rural hospital environment is heterogeneous and the small day-to-day specific local environment primary care network to a rural hospital (e.g., prospective payment system). The cumulative effect of these environments are more dynamic than in small rural hospitals than in a rural hospital. These adaptations and changes in rural hospitals are major public policy issues for the nation's population living in rural areas. For many rural communities, the hospital is the primary access to acute hospital care and the major institution for recruitment of health services.

Resource Dependency as a Strategy for Rural Hospitals

An organization's strategy for survival is effective in helping it achieve its goals.

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