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# Nutrition education needs of Iowa public health nurses providing health-related services to low-income elderly

Carol West Hans  
Iowa State University

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**Nutrition education needs of Iowa public health nurses providing  
health-related services to low-income elderly**

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**Iowa State University, 1990**

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Nutrition education needs of  
Iowa public health nurses providing  
health-related services to low-income elderly

by

Carol West Hans

A Dissertation Submitted to the  
Graduate Faculty in Partial Fulfillment of the  
Requirements for the Degree of  
DOCTOR OF PHILOSOPHY

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Ames, Iowa

1990

## TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION	1
REVIEW OF LITERATURE	6
The Needs Assessment Approach to Educational Evaluation	6
Needs assessment	6
Needs assessment in the health care setting	9
Continuing Education Needs of Public Health Nurses	10
Nutrition care charge of public health nurses	11
Continuing education needs of public health nurses	13
Summary	17
PROCEDURE	19
Plan for Achievement Test	19
Development of Achievement Test	21
Data Collection	25
Data Analysis	27
FINDINGS AND DISCUSSION	28
Description of Sample	28
Highest level of formal education	28
Profile for education and experience	29
Achievement Test Results	30
Raw scores	31
Performance by concept areas and individual items	31
Nutrition education summary	37
Relationship of Variables to Knowledge Score	41
Discussion of Findings	43

	<u>Page</u>
SUMMARY AND RECOMMENDATIONS	48
Recommendations	52
REFERENCES	54
ACKNOWLEDGEMENTS	57
APPENDIX A: REFERENCES USED TO IDENTIFY CONCEPTS, WRITE TEST ITEMS	58
APPENDIX B: AREA NURSING SUPERVISORS	61
APPENDIX C: NUTRITION CONCEPTS IDENTIFICATION	64
APPENDIX D: NUTRITION CONCEPTS RANKING	66
APPENDIX E: NUTRITION QUESTIONNAIRE FOR PUBLIC HEALTH NURSES	71
APPENDIX F: UNIVERSITY HUMAN SUBJECTS APPROVAL	90
APPENDIX G: NONRESPONDENTS' REMINDER LETTER	92



## LIST OF TABLES

	<u>Page</u>
Table 1. Table of specifications for nutrition knowledge test	22
Table 2. Table of specifications for gerontological knowledge test	23
Table 3. Profile for education and experience	29
Table 4. Percentage-correct responses to nutrition in aging items	32
Table 5. Percentage-correct responses to interpretation of food label information items	34
Table 6. Percentage-correct responses to selection of nutritious food bargains items	35
Table 7. Percentage-correct responses to principles of food safety, storage, and sanitation items	36
Table 8. Percentage-correct responses to gerontology items	38
Table 9. Sources of nutrition education materials used with elderly clients	38
Table 10. Kinds of nutrition information provided elderly clients	39
Table 11. Perceived continuing education needs in food and nutrition	40
Table 12. Useful continuing education delivery modes	41
Table 13. Pearson correlation coefficients between knowledge scores and educational variables	42

## INTRODUCTION

Factors initiating or accelerating improved health conditions of Americans across the lifespan have resulted in improvements in longevity. Seven key targets are now identified for interventions to achieve health benefits in the elderly population (McGinnis, 1988). A positive impact on health can be accomplished by regular physical activity, safety and injury control, correct usage of pharmacologic agents, optimum nutrition, social ties, appropriate use of preventive services available from the health care community, and smoking cessation. Less evident in the declining death rates is the impact of disabling chronic disease which is more prevalent as a result of the longer life span. Evidence now exists that the factors for intervention can positively impact health risks which have previously been responsible for impairment from chronic disease.

Nationwide about 85 percent of people over 65 years of age have chronic diseases that could benefit from nutrition intervention, e.g., a diet low in sodium and fat for the client with heart disease. Increased incidence of nutrition-related diseases--osteoporosis, diabetes, hypertension, heart disease, and poor dental health--can affect negatively the nutritional status of the elderly.

The causes of nutrition problems of the elderly are complex. In addition to nutrition-related physiological causes, psychological, social, and economic factors may influence food selection, dietary habits, and nutritional status (Bidlack, 1986). Poor dietary intake

compounded with chronic illness, mental confusion, depression, or limited income may impair health so seriously that hospitalization or institutionalization may be required (Ludman & Newman, 1986).

Because the goal of nutrition care is to improve or enhance nutritional status, health, and well-being (Schlenker, 1984), a change in food habits to improve nutrient intake for the individual at risk may be required. If the present diet is adequate, however, nutrition care can encourage the most effective use of resources in maintaining that intake. Schlenker found that factual knowledge regarding nutrient requirements and appropriate food choices is limited among most adults; many older adults tend to overestimate their nutrition knowledge. Nutrition education for health promotion and disease prevention in the aging is an aspect of aging requiring increased attention, and in particular in states such as Iowa which has a high proportion of the aging population.

The need for nutrition care will increase with the combined factors of limited nutrition knowledge of older adults and the predicted demographic trends toward an increasingly higher percentage of Iowans over the age of 65. Iowa ranks second in the nation for percent of elderly residents. In 1984 Iowa ranked fourth nationally in the percentage of its population aged 65 and over and first in the proportion of aged 85 and over. Iowans 60 years and older account for 17.9 percent of the total population while the nation's proportion is 15.7 percent of the total population. The proportion of Iowans 55+ years is expected to grow to 23.6 percent by year 2000 (Iowa Dept. of Public Health, 1984-86).

This exploding elderly Iowa population has prompted the Iowa Legislature to expand the network of Well Elderly Screening Clinics from 33 to 73 counties by 1992.

Basic to the philosophy of the Well Elderly Screening Clinic (WESC), Iowa Department of Public Health, is the premise that because of the established link between nutrition and health among older adults, it is imperative that WESC include nutrition services. Purposes of the WESC are to provide (1) an entry point for medically underserved older adults into the health care system; and (2) health screening and counseling services to older adults in order to promote optimum health.

The public health nurses are the primary contact in the WESC with the low-income elderly. These professionals are charged with the delivery of a wide range of care to the medically under-served older adults. The WESC health assessment includes nutrition screening, assessment, and education provided by the public health nurses staffing the WESC.

Because the nutrition screening in the WESC health assessment may be the only contact the low-income elderly have with a health professional during the year, the assessment of nutritional status and delivery of nutrition care assumes greater importance because of limited opportunity to counsel these elderly clients on nutritional practices. Optimum nutrition care is dependent upon the public health nurse acquiring an adequate level of proficiency in nutrition knowledge. The limited nutrition education curriculum found in nursing education suggests a less

than adequate level of exposure to this subject matter for providing optimum nutrition care to the elderly client.

A needs assessment is one method of determining whether the public health nurse possesses an adequate level of proficiency in nutrition subject matter. The first step in needs assessment is the establishment of the lowest acceptable level of nutrition knowledge for nurses providing nutrition assessment and care in the WESC. Identification of the present level of knowledge of the nurses follows as the second step. In defining the discrepancy between the acceptable level (standard) and the current level of nutrition knowledge (performance), the discovery of problem areas and weaknesses (discrepancy) which need to be addressed are determined.

The Discrepancy Evaluation Model (Provus, 1971; Steinmetz, 1988), is one method for identifying the continuing education needs of nurses. Inherent in the Discrepancy Evaluation Model is the needs assessment for the basis of program design. The discovery of needs (discrepancies) can be determined by needs assessment of nutrition knowledge of public health nurses.

The nutrition consultants of the Bureau of Nutrition and Health Promotion, Iowa Department of Public Health, have requested identification of the needs in nutrition subject matter areas which public health nurses use in their work with WESC clients. The assessment of needs in nutrition knowledge will be used in planning and providing nutrition continuing education training by the nutrition consultants to public

health nurses assigned to Well Elderly Screening Clinics.

The purposes of the study are to: (1) assess the needs of Iowa public health nurses in food and nutrition subject matter appropriate for use with low-income elderly, and (2) make recommendations from the data collected in the study the subject matter content relevant for a nutrition continuing education training program for the public health nurses. The training will be planned to help them provide higher level health-related nutrition services to the low-income elderly. The study is funded by the Iowa Department of Public Health and Iowa State University.

The following definitions are used in the study:

Needs Assessment: A survey of needs to discover weaknesses or problem areas in the current situation which can be used to project future conditions to which the program will need to adjust.

Public Health Nurse: A graduate nurse, working under the direction of a public health official, who acts as the connecting link between that official and the lay public.

WESC Client: Low-income adults 55 years of age and older living at home whose health is generally good and relatively stable.

## REVIEW OF LITERATURE

Because nutrition care is central to the clinical management of the Well Elderly Screening Clinic client, an assessment is appropriate to determine the continuing education nutrition needs of public health nurses. The needs assessment is one approach to establishing the public health nurses' level of nutrition proficiency. The outcome of the needs assessment will provide the basis for continuing education to prepare the WESC nurses for nutrition care and counseling. The review of literature, therefore, will focus on two major areas: 1) the needs assessment approach to educational evaluation, and 2) continuing education needs of public health nurses.

### The Needs Assessment Approach to Educational Evaluation

The needs assessment approach to educational evaluation is one method based on Provus's Discrepancy Evaluation Model (Provus, 1971). The Discrepancy Evaluation Model (DEM) defines discrepancy as a gap between measures or perceptions of desired performance and observed or actual performance. The DEM (revised) provides the structure for conducting the needs assessment in gathering information for informed decision-making.

#### Needs assessment

The philosophy which is basic to the Discrepancy Evaluation Model views evaluation as a process of (1) agreeing upon standards, (2)

determining whether a discrepancy exists between desired performance and actual performance, and (3) using that information about the discrepancy to make decisions regarding program (Provus, 1971). "Standard" is defined as a list, description, or representation of characteristics the object should possess. The "Standard" is a criterion of what the object should be. "Performance" is the actual behavior or current level of characteristics of the object. A comparison of the "Standard" and "Performance" yields information defined as "Discrepancy". That information is the difference or the gap between the performance (what is) and the standard (what should be). The "Discrepancy" forms the problem areas and weaknesses sought in a needs assessment. Those problem areas and weaknesses sought in the evaluation process serve as the basis for decision-makers to improve program. Determination of the Discrepancy is facilitated with the use of two types of data which are useful in needs assessment.

"Hard" data is based upon controlled, observed performance discrepancies; the term "hard" data is used because of its performance-based source and use of numbers. "Soft" data is based upon the perceptions of experts and those involved in the planning of the needs assessment (sensed needs). Both types of data when combined help to determine the actual needs and allow for setting priorities (Kaufman, 1986).

Needs assessment allows and involves a judgment whereby the relative importance of the determined needs is made. The use of soft data is helpful in making the perceptive judgments of relative need (Seigel,



Attkinson, & Carson, 1978). Thus, needs assessment combines determination of existing discrepancies with action for future planning based on the findings and sensed needs (Kaufman, 1977).

The steps for conducting the needs assessment are as follows:

(1) Setting standards: Explicit standards are set for interpreting test performance. The evaluator must involve decision-makers, those affected by the program, or those for whom the program is designed, to establish realistic and appropriate standards.

(2) Determining data-collection procedures: Choose relevant sources of information. Choose the appropriate data-collection procedure. Select and/or develop tests and provide evidence of validity for the test.

One measurement procedure appropriate for a needs assessment is a criterion-referenced test; this type of test sets a clearly-defined standard (Gronlund, 1990). Generally, a criterion-referenced test is suitable for a needs assessment because the setting of a standard of performance permits determining needs.

(3) Collecting Data: Specify a sampling plan for obtaining subjects (the sample). Develop a plan for collecting and analyzing data. Implement the plan. File and store the information, which involves, sorting, counting, and describing the information.

(4) Determining Need: Analyze the findings and determine the needs. Interpret the needs and formulate conclusions on discrepancies found in the needs assessment (Stufflebeam, McCormick, Brinkerhoff, & Nelson, 1985; Sanders & Murray, 1976). Review and update background information

on changing conditions and new developments which could impact the needs.

The needs assessment is one approach appropriate for use in health care settings. Sound investigation of the needs and the subsequent offering of appropriate continuing education would result in improved quality of client and patient care.

#### Needs assessment in the health care setting

Needs assessment in a particular setting such as a health care agency provides the basis for meeting standards of care demanded by state and federal agencies (Bell, 1986). The health care agency is required to meet standards of care mandated by regulatory agencies in safety, emergency procedures, and nursing practice. Needs assessment in the health care agency also addresses new treatment practices and innovative health care. Needs assessment provides the foundation for continuing education programs which lead to improved health care delivery and to professional development of nurses in the agencies.

A reason for needs assessment for the nursing profession in community health care agencies is reinforced further by an outreach continuing education model for rural geriatric health care providers (Coleman, Davenport, Abbott, & Paton, 1989). The model is based on the premise that meeting health care needs of rural elderly is of critical importance; ongoing education of the nurse providers is vital to success of meeting the health care needs.

Information for the needs assessment can be obtained from interviews, studies and reports, combined with data from individual nurse

questionnaires. The combined information can provide the baseline assessment. The individual specialized questionnaires can be developed for use with nurses in specific settings such as acute care, extended care, community health, occupational health, home health care, schools, and offices (Bell, 1986).

Needs assessment can be a lengthy and costly process. The accurate, up-to-date information resulting from a needs assessment, however, can assist health care agencies in making accurate, well-informed decisions about continuing education for meeting the deficits in health care delivery.

#### Continuing Education Needs of Public Health Nurses

Public health nurses are on the front line of health and nutrition care in the community; they give direction to the continuous process of nutritional evaluation of the client in the WESC. The direction they provide requires purposeful and informed decisions about nutrition care in a functionally appropriate sequence (Mullis & Bowen, 1985). The continuing education provided these health professionals, however, has focused on the use of nutritional assessment tools, such as growth charts, skinfold calipers, and height/weight indexes, rather than focusing on the role of dietary assessment in the process of nutrition care. The focus on dietary assessment requires a basic, up-to-date background in nutrition subject matter.

### Nutrition care charge of public health nurses

The public health nurse who is charged with promoting the health of older adults through assessment of health habits in combination with dietary assessment requires the subject matter background to discover pertinent information affecting nutritional practices (Moyer, 1982; Johnson, Ryan, & Quinn, 1982). Older adults may often be found with limited mobility, limited finances, or lack of will to live. Those intervening circumstances may deter them from good nutritional practices even though they may be knowledgeable about good nutrition (Moyer, 1982).

The importance of promoting optimum nutritional practices is reinforced by statistics ranking the ten leading causes of death in the United States in 1987. Five of the ten leading causes are nutrition-related. The five nutrition-related causes are diseases of the heart, malignant neoplasms, strokes, atherosclerosis, and diabetes mellitus (National Center for Health Statistics, 1988). The same five nutrition-related causes of death in the United States in 1977 ranked in the ten leading causes of death in persons 65 years and older.

In addition to the nutrition-related causes of death in the elderly, both chronic and acute illnesses have been found to occur more frequently in elderly persons who are minorities, poor, have little education, live in rural areas or in inadequate housing, or who are older women (Fredman & Haynes, 1985; Anderson, 1982). The major causes of limited activity in the elderly are attributed to chronic disabling conditions which are more likely to occur in socially and economically vulnerable groups.

Chronic disabling conditions can be attributed to an interaction between genetic and environmental factors (Carotenuto & Bullock, 1980). As an example, a person with a genetic tendency for diabetes would develop a full expression of the disease given the effects of only a few environmental factors, such as excessive chronic caloric intake and obesity.

No studies were found in the literature related to nutrition knowledge of public health nurses. Development of process guides for use in nutrition care as an effort to establish a standard format for continuous process of nutritional evaluation of the public health client was found.

The process guides for nutrition care developed by Mullis and Bowen (1985) are the only nutrition-related strategy found to provide continuing education for health professionals in nutrition care. The purpose of the process guides is to lead public health nurses through appropriate nutritional assessment techniques, intervention strategies, documentation, follow-up, and referral. The nutrition care process guides each were targeted toward selected groups identified by the Virginia Department of Health for use in local health care settings. Those groups were pregnant women, infants from birth to age 2, children 2 to 18 years old, family-planning clients, home health clients, and older adults. Each guide is action oriented, and allows the public health nurse to make purposeful and informed decisions about nutrition care in sequence. The case study approach was used in application of the process

guides.

The process guides reflect both the organizational and the professional goals of nutrition care as defined by local health professionals. The guide for adults 60 years of age and older includes criterion of measurement, value or standard of screening, judgments in assessment, intervention action, report of action taken, and planned follow-up action. The use of such guides can enhance the quality of nutrition care when combined with continuing education workshops to acquaint the nurses with appropriate use of the guides, continuous updating of the materials on advances in nutritional assessment and care, in addition to new procedures for delivery of nutrition care.

A review of the literature with a focus on continuing education needs of public health nurses will follow. The literature will provide a framework in which to determine the needs for continuing education in nutrition for public health nurses in this study.

#### Continuing education needs of public health nurses

The challenge of staying current through lifelong education in the nursing profession where obsolescence is a daily reality is considered a necessity by both individual nurses and the professional nursing organizations (Bell, 1986). Reinforcement is provided by both The American Nurses' Association and The National League for Nursing who have endorsed continuing education as a necessity for professional nurses to maintain competency and to increase knowledge to prevent the obsolescence which they face daily. Continuing education for the nursing profession is

complicated by the wide variations existing in nursing education and in the personal and professional experiences of nurses.

Needs assessment for nursing professionals' continuing education falls within three areas: (1) general needs assessment, in which topics identified may not be appropriate to the groups within the population being surveyed; (2) identification of features of nursing continuing education important to the nurses themselves, which deals with process for marketing rather than assessing the need for specific content; and (3) needs assessment which deals with a particular topic or a particular setting (Chesney & Beck, 1985). The second and third types of needs assessment are the ones appropriate to this literature review. An assessment of the perceived continuing education needs of registered nurses will be discussed, followed by a continuing education needs assessment of registered nurses in a particular setting, which deals with a particular setting such as in the WESC employed in this study.

The importance of separating need for continuing education from interest in continuing education for registered nurses was demonstrated in a Texas study of registered nurses. Data were collected as part of a sample randomly selected from a list of registered nurses from the Texas State Board of Nurse Examiners (Chesney & Beck, 1985). Questionnaires were mailed to 400 nurses' homes; 195 returned the questionnaire for a response rate of 48.8 percent.

Respondents who identified a need for continuing education in patient assessment also were found to rate themselves as having more

skill than nurses who did not identify such a need. In all five categories (Patient Assessment and Care Planning, Patient Care Procedures and Techniques, Nursing Management and Leadership, Communication with Other Personnel, and Personal and Professional Development) of continuing education programs, the nurses identified continuing education needs in those areas where they felt most competent. Nurses with lower skill levels were found to be less likely to identify an interest in continuing education. That finding should not be taken at face value without considering the individual's motivation to develop a nursing skill and the importance of a particular nursing skill in performing one's job. Information on these intervening variables was missing in the study (Chesney & Beck, 1985).

Determination of the characteristics of registered nurses working in Iowa hospital emergency departments, and identification of the nurses' perceptions regarding their learning needs were the object of a continuing education needs assessment in Iowa (Milde, Powell, Ruther, Thomas, & Glick, 1980). The study provided a logical step in planning continuing education based on individual differences in knowledge, skills, and interest found in the nursing profession.

A questionnaire was distributed by the director of nursing in each hospital to registered nurses employed in the emergency departments. No record is available of the total number of questionnaires distributed to the sampling frame. The mailed survey produced 344 usable questionnaires from nurses employed in emergency departments that were



members of the Iowa Hospital Association. One hundred thirty-seven of 146 Iowa hospitals are members of the Iowa Hospital Association (Milde et al., 1980).

Results suggest that the nurses had little or no experience in community health and psychiatric nursing. The findings also supported the need to consider alternate approaches to continuing education. A strong preference for closed circuit television and self-learning packets suggested the need to offer continuing education in ways that do not take nurses away from their jobs for an extended period of time (Milde et al., 1980). The use of available technology to facilitate continuing education for emergency department nurses was concluded to be a viable approach.

The gerontological background of the public health nurses staffing WESC also needs to be considered when planning continuing education programs. Traditionally, nursing students have had little, if any, training in gerontological concepts. Only recently have health care providers started to address the unique needs of the elderly.

Ziv (1989) hypothesized that registered nurses would not develop favorable attitudes toward the aged without some prior background in gerontology. Therefore, she developed and taught a course related to geriatric nursing to a class of fifteen female registered nurses, 13 employed in hospitals and 2 in public health services.

The topics included in the course were:

Social changes

Physical changes in aging

Usefulness of aged persons and contributions they can and do make to society

Identification of characteristics of the able elderly as opposed to total concentration on the incapacitated elderly

The course as taught, did achieve the main goal of "increasing the students' awareness of the needs of the aged and of the aged as valued individuals and a normative group in society" (Ziv, 1989). Her findings suggested that the registered nurses' attitudes toward the elderly appeared unaltered in the geriatrics course without some background in gerontology. She further concluded that in order to produce a positive attitude of nurses towards the aged, the gerontological topic should be introduced in nursing schools, and further developed in continuing education programs.

#### Summary

The broadened scope of service in community health nursing has placed public health nurses on the front line of health care in the community. Providing quality care demands greater efforts to deepen existing knowledge, to develop an awareness of trends in professional practice, and to learn new skills.

Broadened scope of service by the public health nurse in the WESC includes nutrition care and counseling. Though the process of nutrition care is necessary for the clinical management of the public health client, the care has not been provided because of lack of appropriate

training (Mullis & Bowen, 1985). One of the reasons that appropriate training has not been provided appears to be the lack of needs assessments in nutrition knowledge for giving direction to continuing education (Mullis & Bowen, 1985).

An example of setting standards of nutrition care with use of process guides, one of which is targeted for use with the older adult, has been found to be effective in nutritional assessment by community nurses' receiving continuing education training in use of the guides. Continuing education needs assessed in a particular work setting found that registered nurses' need to stay current requires flexibility and improved use of available technology to facilitate continuing education. Further, it appears that working effectively with elderly clients is enhanced by continuing education in gerontology subject matter.

The nutrition-knowledge needs of public health nurses staffing WESC must be identified for planning appropriate training. A needs assessment is one appropriate method for identification of the nutrition education needs of Iowa public health nurses. The purpose of this research is to identify those nutrition education needs. The identified needs will be used by the Bureau of Nutrition and Health Promotion, Iowa Department of Public Health, in planning continuing education for WESC staff nurses in nutrition subject matter.

## PROCEDURE

This study focused on development of a nutrition achievement test for assessing the educational needs of public health nurses in food and nutrition for the elderly.

Specific objectives of this study were to:

- (1) Develop and validate a criterion-referenced achievement test for determining the knowledge level of Iowa county public health nurses in the area of food and nutrition as related to the elderly.
- (2) Determine nutrition education needs of Iowa county public health nurses by measuring levels of achievement on the criterion-referenced achievement test.
- (3) Make recommendations for educational concepts related to food and nutrition that can be incorporated into nutrition education training for public health nurses by the Bureau of Nutrition and Health Promotion, Iowa Department of Public Health.
- 4) Explore the relationship between the knowledge level of Iowa county public health nurses and demographic, educational and personal variables.

## Plan for Achievement Test

Major concept areas in food and nutrition for the elderly were identified from textbooks, geriatric nutrition books, and other resources including United States Department of Agriculture publications (See Appendix A). The four major concept areas identified were (1) role of nutrition in aging, (2) principles of food safety, (3) food labeling information, and (4) nutritious food selections.

Twelve area nursing supervisors (see Appendix B) were identified to assist in prioritizing the relative importance of the major concept areas and to identify the subconcept areas of nutrition knowledge considered relevant for public health nurses working in Well Elderly Screening Clinics.

A one-page list of nutrition concepts (see Appendix C) from those identified in reliable nutrition sources was mailed to the twelve nursing supervisors who are themselves public health nurses. They were asked to rank each concept as "Great", "Moderate", or of "Little" Importance. They also were asked for additional suggestions. Those concepts ranked as "Little" Importance were discarded. A face-to-face interview with the twelve supervisors was held to clarify their responses.

Visits to two county Well Elderly Screening Clinics (WESC) were made by the researcher to interview the public health nurses assigned to the Clinics. The list of nutrition concepts submitted to the supervisors for ranking also was used in these visits as a basis for discussion with the WESC nurses. Interviews included informal discussion of the nutrition problems of their clients, and the nurses' perceived need for nutrition knowledge.

A questionnaire was developed from the responses collected from the twelve supervisors and the public health nurses interviewed in the two WESC. The questionnaire consisted of the following food and nutrition concepts and subconcepts:

(1) role of nutrition in aging: chronic disease, key nutrients, modified diets, menu planning, food preparation techniques, food fallacies, nutrition supplements, food-drug interactions

(2) principles of food safety, sanitation, and storage: food safety, sanitation, storage, and safety techniques for elderly persons

(3) interpretation of food label information: calorie, sodium, fat, and sugar labeling interpretation; food label laws

(4) selection of nutritious food bargains: food selection, convenience foods, cost-cutting techniques

This questionnaire (see Appendix D) was administered by direct mail to twelve community nutritionists identified from the twelve Iowa Area Agencies on Aging and to the twelve public health nurse supervisors previously interviewed. They were asked to rank the concepts and subconcepts on a scale of 1 to 5, one being "Highly Important" and 5 being "Highly Unimportant". The concept values ranked by the respondents were calculated and converted to percentages. The percentage for each concept was transferred to a table of specifications as the total percentage for each concept (subject matter content). The sum of percentages of the four concepts is 100 percent.

#### Development of Achievement Test

A table of specifications was developed as a basis of the achievement test for needs assessment. The percentages at each cognitive level and concept (subject matter content) were weighted in terms of their

relative importance to provide a representative sample of items. Although the community nutritionists and public health nursing supervisors would have focused on knowledge and comprehension items, the community nutritionist initiating the study requested an approximately equal weighting of knowledge, comprehension, and application items. The achievement test items were written to conform to the table of specifications which is shown in Table 1, using the value rankings of the subconcepts as a guideline for subject matter content.

Table 1. Table of specifications for nutrition knowledge test

Subject Matter Content	Cognitive Levels			Total
	Knowledge %	Comprehension %	Application %	%
Role of nutrition in aging	11	16	12	39
Principles of food safety, storage, and sanitation	12	12	10	34
Interpretation of food label information	5	4	4	13
Selection of nutritious food bargains	5	5	4	14
<b>TOTAL</b>	<b>33</b>	<b>37</b>	<b>30</b>	<b>100</b>

A second table of specifications was developed based on three concepts of gerontological subject matter for the purpose of sampling knowledge about aging. The percentages were determined to provide a small but representative sample of knowledge and comprehension items of the subject matter. The content of the items was determined in consultation with a gerontological specialist. This table of specifications is shown in Table 2.

Table 2. Table of specifications for gerontological knowledge

Subject Matter Content	Cognitive Levels			Total
	Knowledge %	Comprehension %	Application %	%
Sociological	0	40	0	40
Psychological	20	0	0	20
Physiological	20	20	0	40
TOTAL	40	60	0	100

Eighty achievement test items were written in multiple choice format. Multiple choice format was chosen because the multiple choice item is one of the most widely applicable test items for measuring achievement. The multiple choice format can measure effectively various types of knowledge and complex learning outcomes (Gronlund, 1990). Items



were written to provide a relevant and representative sample of the table of specifications, and to ensure only one correct answer.

The achievement test was submitted to a panel of seven judges. The judges were nutritionists and dietitians who were faculty from Iowa State University, and staff from Iowa Department of Public Health and Iowa Department of Elder Affairs. They were asked to verify accuracy and relevance of current information in the test items, and to determine that this is the kind of nutrition information public health nurses need to know. The test items were examined by an evaluation specialist to verify adherence to accepted principles of item-writing.

The first seventy-five items in the test were nutrition knowledge items based on Table 1. The following five items were gerontology knowledge items based on Table 2.

Section II of the test included nine items related to demographic variables of education, work experience, and personal experience with elderly family members. Twenty-nine items asked for information related to nutrition resources needed and used with elderly clients, and perceived nutrition education inservice needs.

The achievement test was pilot tested with the twelve area nursing supervisors representing the state to evaluate usability of the achievement test. Slight revisions were made. The instrument was determined to be a usable instrument for this study (see Appendix E). The instrument also was approved for use of human subjects in research by the University Human Subjects Committee (see Appendix F).

### Data Collection

The achievement test was sent by direct mail to 174 county public health nurses. Accompanying the test was a cover letter under the names of a community nutritionist, Bureau of Nutrition and Health Promotion, Iowa Department of Public Health, and the researcher.

The nurses were directed not to use a resource in answering questions. Although the administration of the questionnaire was not monitored, the findings are assumed to be representative of the respondents' knowledge. There was no reason to expect that the respondents would use a resource to answer the questions when specifically requested to refrain from such action. They were assured of confidentiality to relieve anxiety about being tested.

The sample consisted of 104 county nurse administrators and 70 Well Elderly Screening Clinic nurses; this sample included nurses from all ninety nine Iowa counties. The list of names was provided to the researcher by the Iowa Department of Public Health. Though a random sample would have been preferable to the sample used, a complete list of all Iowa county public health nurses was not available. Therefore, a decision was made to use the sample that included the names of county public health nurses; use of the specified sample was preferable to sending a direct mail achievement test to a county public health office for distribution to unknown public health nurses.

The respondents marked their answers on machine-scorable answer sheets. Answer sheets were returned in self-addressed, stamped envelopes

with no return address to assure confidentiality. The only identification was the code number placed on the answer sheet by the researcher that corresponded with the name on the mailing list. This provided the researcher a means for contacting nonrespondents.

Nonrespondents were sent a letter of reminder after fourteen days (See Appendix G). The second follow-up consisted of a personal phone call to each nonrespondent.

A response rate of 77 percent to the knowledge items provided 134 responses from county public health nurses, all of which were usable. The response rate for Group 1, the county nurse administrators, was 81.7 percent; for Group 2, the WESC nurses, the response rate was 70.0 percent. The response rate was considered excellent. When compared to similar mailed surveys of this type to Registered Nurses, a 51 percent response rate was reported (Zorn & O'Keefe, 1989).

A summary of the demographic and personal data provided a response rate of 74 percent with 129 useable surveys. Response rate for the county nurse administrators was 76.9 percent and 70.0 percent for the WESC nurses.

Although not a random sample, responses were received from county public health nurses in 84 of 99 Iowa counties. Given the 77 percent response rate of public health nurses in Iowa and the high percentage of counties represented, it seems prudent to judge that the findings adequately represent the needs of public health nurses in Iowa.

### Data Analysis

Achievement test results were summarized. The percentage-correct of individual items was computed as was the percentage-correct by the major sub-concept areas. A single classification analysis of variance was calculated to determine significant differences in nutrition knowledge between county public health administrators and public health nurses actively working in WESC. Correlation coefficients were calculated between the mean nutrition knowledge score and education, work experience, and contact with the elderly. These analyses were judged appropriate because of the variability of scores obtained on the achievement test. Source of nutrition education materials, perceived inservice education needs, nutrition education delivery modes, and nutrition information provided clients were summarized in frequency tables.

## FINDINGS AND DISCUSSION

The purpose of the study was to assess the educational needs of Iowa public health nurses for nutrition counseling of the elderly using The Nutrition Questionnaire for Public Health Nurses. The educational needs are based on data obtained from 85 county nurse administrators and 49 WESC nurses in their responses to the Questionnaire.

The findings of this study will be presented and discussed in the following four sections: (1) description of the sample, (2) achievement test results, (3) relationship between knowledge scores and demographic, educational and personal variables, and (4) discussion of the findings.

### Description of Sample

Variables describing the sample included highest level of formal education, number of years since completing last degree, number of years employed as a public health nurse, work experience with elderly clients, and personal experience with elderly relative living in respondent's home.

#### Highest level of formal education

A bachelor's degree was reported as the highest degree attained by 106 public health nurses (83%). Twenty-one or 16 percent reported course work beyond a bachelor's degree, and 2 nurses or 2 percent had obtained a master's degree.

Profile for education and experience

Data provided in Table 3 indicate that forty-three or 34 percent of the public health nurses have completed their last degree within the past ten years. Forty-four or 34 percent obtained their degree in the past 11-20 years, and 41 or 32 percent obtained their degrees over 20 years ago.

Table 3. Profile for education and experience

Nursing profile	Number Years						Total
	0-10		11-20		Over 20		
	N	%	N	%	N	%	
Years since last degree	43	34	44	34	41	32	128
Public health nursing experience	87	68	34	26	8	6	129
Work experience with elderly	52	40	58	45	19	15	129
Elderly relative living in home	24	19	3	2	0	0	129 <sup>a</sup>

<sup>a</sup>Of the 129 respondents, only 27 had experience with an elderly relative living in their homes.

Eleven or 9 percent of the respondents have acquired one to nine semester hours credit in nutrition in the past two years. Forty-two or 33 percent reported acquiring one to twelve continuing education units in nutrition in the past two years.

Only eight or 6 percent of the nurses have had over 20 years public health nursing experience, with 87 or 68 percent reporting no more than ten years experience.

Only 27 or 21 percent of the public health nurses reported the experience of having an elderly relative ever reside in their home with them. Work experience with the elderly was higher, with 52 or 40 percent reporting up to ten years experience, and 58 or 45 percent reporting 11-20 years experience.

#### Achievement Test Results

Data from the achievement test will be discussed as raw scores, performance by concept areas and individual items, and a nutrition education summary.

The standard of proficiency on the achievement test was set at 80 percent for respondents. Setting such a standard of performance is an arbitrary decision. A standard of 80 to 85 percent correct is acceptable (Gronlund, 1990). The researcher set the standard of 80 percent correct as a reasonable requirement for public health nurses who provide to low-income elderly nutrition information which is expected to be accurate and current.

### Raw scores

The average test score for all respondents on the 80 item questionnaire was 51.5 percent correct. Raw scores ranged from 25 percent to 72.5 percent correct; the standard deviation was 6.9. Percentage-correct scores for Group I, county nurse administrators, ranged from 25 percent to 67.5 percent, with a mean score of 50.7 percent and standard deviation of 6.6. Percentage-correct scores for Group II, WESC nurses, ranged from 30 percent to 72.5 percent, with a mean of 52.7 percent and a standard deviation of 7.3. A single classification analysis of variance showed no significant difference between the mean scores of the two groups.

Correct responses on individual items ranged from 5 percent to 100 percent. One item was answered correctly by all respondents; no item was answered incorrectly by all respondents.

### Performance by concept areas and individual items

The average percentage-correct score for the concept, Nutrition in Aging, was highest at 57 percent. The average score for Food Labeling was 50 percent, followed by Nutritious Food Choices at 49 percent correct. Both Food Safety and Gerontology concept scores were 47 percent correct.

Data presented in Table 4 provide a summary of items for Nutrition in Aging. Percentage-correct scores for the 30 items ranged from a low of 27 percent items correct to 87 percent items correct. The average score was 57 percent with a standard deviation of 3.7. Responses to only



Table 4. Percentage-correct responses to nutrition in aging items

Item Number	Essence of Item	% Correct
72	Bone disease associated with poor vitamin D nutriture	28
1	Vitamin in dark, green, leafy vegetables	38
49	Protection against vitamin E deficiency	39
20	At-risk person for food-drug interactions	42
10	Food choice for fat-modified diet	42
5	Dietary recommendations for diabetic	42
74	Treatment to retard osteoporosis	43
65	Calculation of percentage protein intake	45
6	Nutrient absorption affected by mineral oil	45
57	Nutrients affecting taste sensitivity	46
73	Physiological reaction to mild illness	49
27	Food which enhances iron absorption	49
46	Calculation of kilocalories in food	52
33	Recommended weight loss practice	54
17	Calculation of percentage fat intake	55
2	Food selection for arthritic clients	57
21	Iron absorption from foods	60
47	Best choice of vitamin/mineral supplements	67
30	Appropriate vitamin/mineral supplement recommendation	69
53	Legitimate use of chelation therapy	74

Table 4. (Continued)

Item Number	Essence of Item	% Correct
59	Practical nutrition assessment method	75
45	Food choice to enhance protein intake	80
3	Food modification for clients with dental problems	82
62	RDA for energy	82
71	Recommended weight reduction guidelines	84
29	Vegetable oil containing most saturated fat	87
11	Nutrient depleted by diuretics	99
24	Physiological changes of aging	100

seven items met the minimum level of performance of 80 percent.

Interpretation of Food Label Information concept responses are summarized in Table 5. A low score of 10 percent correct and a high score of 80 percent correct was found for the 10 items. The average for this group of items was found to be 50 percent with a standard deviation of 1.4. Responses to only two items met the minimum level of performance of 80 percent.

Table 5. Percentage-correct responses to interpretation of food label information items

Item Number	Essence of Item	% Correct
42	Food choice containing nutrient additive	1
18	Interpretation of U.S. RDA on food labels	3
69	Meaning of "low sodium" label	20
28	Meaning of term "expiration date"	29
40	Interpretation of nutrition information label (milligrams of iron)	38
38	Interpretation of nutrition information label (cereal nutrients)	59
15	Choice of iron-rich foods	64
35	Features of generic labeled foods	64
41	Interpretation of nutrition information label (nutrient content of butter and milk)	77
39	Interpretation of nutrition information label (food source of riboflavin)	78
25	Interpretation of "reduced calorie" label	88
70	Food label interpretation (quantity)	92

Responses to 11 items under the concept of Selection of Nutritious Food Bargains ranged from 9 percent correct to 82 percent correct. The average score was determined to be 49 percent with a standard deviation of 1.25. A summary of the data for selection of

nutritious food bargains is found in Table 6. Responses to four of the items met the 80 percent minimum level of performance.

Table 6. Percentage-correct responses to selection of nutritious food bargains items

Item Number	Essence of Item	% Correct
32	Strongest determinant of food choices	7
52	Food selection rich in zinc	15
51	Choice of low-sodium, low-fat fast food	18
12	Selection of lean meat cuts	22
4	Food selection by low-income elderly	22
9	Food intake practice of older single men	30
60	Inexpensive protein food choices	54
34	Food group purchased in greatest proportion	84
37	Content of soft water	93
66	Content of processed foods	96
50	Meal containing most dietary fiber	98

Responses to 24 items under the concept of Principles of Food Safety, Storage, and Sanitation ranged from 17 percent correct to 75 percent correct. The average score was 47 percent with a standard deviation of 2.66. A summary of the percentage of respondents correctly

answering the items is contained in Table 7. Responses to only two of the items met the 80 percent minimum level of performance.

Table 7. Percentage-correct responses to principles of food safety, storage, and sanitation items

Item Number	Essence of Item	% Correct
36	Source of lead in foods	9
26	Food practices leading to Salmonella food poisoning	14
14	Choice of safe refrigerated foods	18
67	Choice of safe herbal tea	18
56	Safe handling of eggs	19
63	Safe food handling procedure (choice)	25
54	Safe food handling procedure (storage)	29
58	Safe choice of calcium source	30
61	Safe handling of ground beef	31
44	Safe food selection by elderly	43
55	Safe food handling procedure (perishable food)	45
43	Safe food choices for asthma patients	46
23	Safe refrigerator temperature	50
8	Storage sensitivity of riboflavin	60
68	Purpose of food additives BHA/BHT	61
31	Food source of poor quality protein	63

Table 7. (Continued)

Item Number Number	Essence of Item	% Correct
64	Safe food handling procedures (temperature)	66
7	Safe choice of nutrient-fortified foods	67
22	Method of extinguishing fat fire	79
75	Source of food protection for health	92
13	Source of vitamin D toxicity	95

A summary of 5 Gerontology items is given in Table 8. Low score was 0 percent correct and high score was 100 percent correct. The average score was 47 percent with a standard deviation of 1.05. Responses to only one of the five items met the 80 percent minimum level of performance.

#### Nutrition education summary

A summary of the source of nutrition education materials used by the respondents with elderly clients is contained in Table 9. Forty-seven to 60 percent of respondents reported using popular and commercial materials often. Whether those materials present accurate nutrition information is questionable.

Table 8. Percentage-correct responses to gerontology items

Item Number	Essence of Item	% Correct
79	Definition of "ageism"	26
78	U.S. model of chronic disease treatment	30
80	Frequent mistake with prescription drugs	45
77	Sociological characterization of elderly	51
76	Most common nonorganic mental disorder	87

Table 9. Sources of nutrition education materials used with elderly clients

Source	Helpful %	Not Helpful %	Do Not Use %
Cooperative Extension Service	89	1	10
Volunteer Organizations (American Heart Association)	88	2	10
Professional Books/Journals	78	7	15
Department of Public Health	76	8	16
Commodity Groups (Beef, Pork, Dairy)	62	12	26
Popular Books and Magazines	60	13	27
Commercial Companies	47	21	32

The kinds of nutrition information provided elderly clients most often by the respondents is summarized in Table 10. Information provided to elderly clients most often by 79 to 90 percent of the respondents is related to nutrition in aging and/or chronic disease.

Table 10. Kinds of nutrition information provided elderly clients

Subject	Often %	Not Often %
Nutrition in Aging	90	10
Modified Diets	84	16
Food-Drug Interactions	79	21
Food Supplements	70	30
Food Preparation Techniques	58	42
Food Facts and Fallacies	56	44
Food Labeling	52	48
Food Safety	50	50

A summary of perceived continuing education needs in food and nutrition which would be most helpful to the respondents in counseling elderly clients is found in Table 11. Perceived continuing education needs in food and nutrition were reported by 90 percent of the respondents to be most needed in nutrition in aging and/or chronic disease.



The perceived needs for continuing education are consistent with kinds of information reported to be provided in counseling elderly clients.

Table 11. Perceived continuing education needs in food and nutrition

Subject	Helpful %	Not Helpful %
Food-Drug Interactions	98	2
Nutrition in Chronic Disease	95	5
Food Facts and Fallacies	95	5
Modified Diets	91	9
Food Safety	90	10
Food Supplements	90	10
Food Preparation for One or Two	85	15
Food Labeling	83	17
Food Preparation Techniques for Disabled	81	19

Delivery modes considered most useful to respondents for receiving information and continuing education in nutrition are summarized in Table 12. Face-to-face continuing education in nutrition combined with resource materials and continuing updates by newsletter are preferred by 91 to 98 percent of the respondents.

Table 12. Useful continuing education delivery modes

Mode	Helpful %	Not Helpful %
Face-to-Face Inservice Education	98	2
Newsletter	97	3
Single Concept Leaflets	96	4
Resource Manual	91	9
Individual Consultations	75	25

#### Relationship of Variables to Knowledge Score

The relationships between the knowledge scores of Iowa public health nurses and their demographic and educational variables were explored. Those variables studied were highest level of education, number of years since obtaining last degree, number of semester hours in nutrition acquired in the past two years, number of continuing education units in nutrition acquired in the past two years, number of years employed as a public health nurse, and percentage case load of elderly clients. Pearson product-moment coefficients of correlation were used to test the relationships. The data are provided in Table 13.

Statistically significant correlation coefficients were found between highest level of education and scores on the gerontology items ( $r = 0.24$ ), and CEU's in nutrition within the last two years and scores on nutritious food choice items ( $r = .28$ ) and the total nutrition knowledge

Table 13. Pearson correlation coefficients between knowledge scores and educational variables (N=129)

Educational variables	Gerontology items N = 5	Nutritious food choice items N = 11	Food labeling items N = 10	Food safety items N = 24	Nutrition in aging items N = 30	Total nutrition knowledge items N = 75
Highest level education	0.24**	0.05	-0.10	0.04	0.01	0.01
Years since last degree	-0.10	0.13	-0.12	0.01	-0.09	-0.05
Semester hours nutrition last 2 years	0.00	0.12	0.01	0.16	0.05	0.12
CEU's nutrition last 2 years	0.08	0.28**	0.12	0.12	0.10	0.19*
Years public health nurse experience	-0.13	0.00	-0.10	-0.05	-0.14	-0.19
% case load elderly	0.17	0.06	0.03	-0.06	0.16	0.08

\*p ≤ 0.05.

\*\*p ≤ 0.01.

items ( $r = .19$ ). Inspection of the table shows the correlations represent a common variance ( $r^2$ ) of only 6 percent on the gerontology items, 8 percent on nutritious food choice items, and 4 percent on the total nutrition knowledge items. Because 94 percent, 92 percent, and 96 percent, respectively, of the variance is not accounted for, these relationships are not considered to be of practical significance.

#### Discussion of Findings

The Nutrition Questionnaire was designed to assess the educational needs of Iowa public health nurses for nutrition counseling of the elderly. None of the public health nurses achieved the minimal level of competency of 80 percent. This finding is not surprising considering that nutrition is not heavily emphasized in nursing curricula. The low level of exposure to nutrition subject matter in nursing curricula and recent nutrition subject matter in continuing education suggests a plausible explanation for the low level of competency related to nutrition knowledge. These factors also suggest that expectations for the nurses to be providing nutrition counseling may be unrealistic.

The respondents' highest percentage-correct scores were in the concept of Nutrition in Aging (57%). The percentage-correct score is too low for adequate expertise in providing nutrition counseling, considering that the respondents reported the kinds of nutrition information they most often provided elderly clients fell within this concept. Those items which were lowest in percentage-correct are identified as continuing education needs. These are nutrient content of foods, nutrients

related to chronic disease, and planning modified diets for specific chronic diseases.

One item was answered correctly by all respondents. The item related to the effect of nutrition on physiological changes of aging, and would logically be related to nursing education curricula.

Percentage-correct scores of the concepts Food Safety, Storage, and Sanitation (47%); and Gerontology (47%) were lowest. Food Safety, Storage, and Sanitation is critically important for good health if foodborne illness is to be avoided; elderly clients, especially those with chronic disease, are more vulnerable to disease because of a lowered resistance from a weakened immune system. They are thus more vulnerable to poor practices of food safety than is the general population. Foodborne illness can result in serious illness or even death. Percentage-correct scores were lowest in the principles of food handling in refrigeration and in preparation. These principles are suggested to be of greatest need in continuing education for providing counseling on Food Safety, Storage, and Sanitation to the elderly client.

The lack of exposure in gerontology coupled with a low level of competency in nutrition subject matter imply a difficult counseling task with elderly clients for WESC nurses. Five items on Gerontology suggest little or no understanding of gerontological principles. Gerontology is a recent study of aging; only since the 1960s has research and education on aging expanded rapidly. Because only about one-third of the respondents have acquired their latest degree in the last ten years, the

findings support the suggestion of little previous educational background in gerontology. Furthermore, teaching gerontology to Registered Nurses seems to be essential for positively influencing nurses' attitude toward elderly people.

The respondent's source of nutrition education materials consists of accurate nutrition information, such as the Cooperative Extension Service, except for the categories of popular books and magazines and commercial materials, which may be questionable. The materials in question can only be determined to be correct by persons qualified to verify the accuracy of the materials. The respondents' inability to meet the minimum level of competency on the nutrition questionnaire suggests the popular and commercial materials should not be used by the WESC nurses without approval from Community Nutritionists, Bureau of Nutrition and Health Promotion, Iowa Department of Public Health. The materials from volunteer organizations and the commodity groups are generally considered accurate, but those materials also should be reviewed for relevancy before using as resources with elderly clients.

The respondents report extensive use of nutrition information from Cooperative Extension Service, volunteer organizations, professional books and journals, and Department of Public Health. From 76 percent to 89 percent of the respondents report these materials are helpful in their work; these findings suggest a positive influence in dissemination of nutrition information and education of clients.

The range of low to nonexistent significant correlation coefficients

found between the respondents' scores on the questionnaire and the educational variables is further evidence of the inconsequential exposure of registered nurses to nutrition subject matter. The relationship ( $r = .19$ ), though weak, between nutrition knowledge scores and continuing education units in nutrition obtained within the past two years suggests that continuing education does make a difference in nutrition knowledge, and thus, supports the need for such inservice.

The ability to counsel elderly clients on nutrition is not reflected in the knowledge scores; the questionnaire was not a measure of effective use of nutrition knowledge. Thus the findings from the data do not indicate how the respondents use their nutrition knowledge in counseling WESC clients.

The following recommendations are made to the Chief, Bureau of Nutrition and Health Promotion, Iowa Department of Public Health, in planning continuing education for public health nurses staffing Iowa WESC:

1. Employment of registered dietitians in the WESC is recommended for working with the public health nurses and clients based on the findings that none of the respondents achieved the 80 percent minimal level of competency. Until the recommendation becomes reality, continuing education is recommended for the nurses.

2. The following subject matter content areas were found to be of greatest need:

- a. Food handling, storage, cost, and labeling

- b. Diet counseling and planning
- c. Important nutrients for the elderly
- d. Drug-nutrient interactions and abuse of nutrient supplements
- e. Social-gerontological concepts

3. Based on an analysis of the educational and personal variables, the following suggestions are made for planning an ongoing continuing education program:

- a. Provide face-to-face regional continuing education workshops in nutrition education reported to be most useful by the sample.

- b. Prepare ongoing updates via newsletters and a resource guide to be mailed after the continuing education workshops.

4. Consider the following suggestions in planning the continuing education workshops:

- a. Select a representative group of county public health nurses to assist in planning continuing education.

- b. Involve other agencies in the nutrition education workshops so that the public health nurses can benefit from other health professionals' expertise.

- c. Plan a needs assessment in nutrition knowledge and social-gerontological beliefs and evaluation of WESC nutrition counseling every two years to keep WESC staff current and to provide training to new staff.

5. Provide the findings from this study to Chief, Public Health Nursing Bureau; Consultant, Well Elderly Screening Clinics; Director,



Iowa Department of Public Health; Director, Iowa Department of Elder Affairs; Director, Iowa Department of Human Services; and Home Economics Program Leader, Iowa State University Cooperative Extension Service.

## SUMMARY AND RECOMMENDATIONS

The purposes of this study were to: (1) assess the needs of Iowa public health nurses in food and nutrition subject matter appropriate for use with low-income elderly by measuring levels of achievement on a criterion-referenced test, and (2) make recommendations from the data collected in the study the subject matter content relevant for a continuing nutrition education training program for the public health nurses. The needs assessment findings as a basis for subsequent continuing education training would provide the public health nurses an up-to-date subject matter background in nutrition for assisting them in providing higher level health-related nutrition services to the low-income elderly in Iowa Well Elderly Screening Clinics.

Nutrition concepts relevant to the elderly were identified by area public health nursing supervisors, Area Agency on Aging community nutritionists, and by county public health nurses in two Iowa counties. The major concepts identified were (1) role of nutrition in aging, which included chronic disease, key nutrients, modified diets, menu planning, food preparation techniques, food fallacies, nutrition supplements, and food-drug interactions; (2) principles of food safety, sanitation, and storage, which included food safety, sanitation, storage, and safety techniques for elderly persons; (3) interpretation of food label information, which included calorie, sodium, fat, and sugar labeling interpretation, and food label laws; and (4) selection of nutritious food bargains, which included food selection, convenience foods, and cost-cutting

techniques.

The ranking of the concepts by the nursing supervisors and the community nutritionists determined the concept's relative importance for providing a representative sample of items. The relative importance computed as percentages provided the basis for the table of specifications. A multiple choice nutrition achievement test was developed from the table of specifications. The achievement test contained 75 nutrition items and 5 gerontology items; the second section of the test included 38 demographic, educational, and personal characteristic items. The five gerontological items were included to assess the respondent's acquaintance with gerontological concepts; the demographic, educational, and personal characteristic items were used to study the relationship to education and experience with elderly to nutrition and gerontological knowledge of the elderly.

The achievement test was submitted to a panel of seven judges who were faculty from Iowa State University, and staff from Iowa Department of Public Health and Iowa Department of Elder Affairs. They were asked to verify accuracy and relevance of current information; the test items were examined by an evaluation specialist to verify adherence to accepted principles of item-writing.

Twelve area nursing supervisors representing the state pilot-tested the achievement test to evaluate usability of the test. Revisions were made from the pilot test. The instrument was approved for use of human subjects by the University Human Subjects Committee.

The revised achievement test was sent by direct mail to 104 county nurse administrators and 70 Well Elderly Screening Clinic nurses. The convenience sample was one for which names could be obtained and included nurses from all one hundred Iowa counties. The responses from the sample were received from 84 counties. A response rate of 77 percent to the 80 knowledge items provided 134 usable responses. A summary of the demographic, educational, and personal data provided a response rate of 74 percent with 129 usable surveys. Because of the response rate, it seemed prudent to conclude that the findings adequately represented the continuing education needs of the public health nurses of Iowa.

The data were analyzed using the criterion-referenced interpretation which describes an individual's performance without reference to others. The mean and standard deviation were computed. The percentage-correct responses for each item and concept area were calculated.

The average percentage-correct score on the 80 item achievement test was 51.5 percent with a standard deviation of 6.91. The average score for Group I, county nurse administrators, was 50.7 percent with a standard deviation of 6.61, and for Group II, WESC nurses, the average score was 52.7 percent with a standard deviation of 7.3. An analysis of variance: single classification showed no significant difference between the mean scores of the two groups.

A standard of performance for percentage-correct response to items was set arbitrarily at 80 percent. Test analysis by concept revealed that the concept, Nutrition in Aging, score was highest at 57 percent

correct. Food Labeling concept score was 50 percent correct, followed by Nutritious Food Choices at 49 percent correct. Both Food Safety and Gerontology scores were 47 percent correct.

None of the respondents achieved the minimal level of competency of 80 percent correct. Only 16 of the 80 items were scored at 80 percent correct or higher.

Study of the data indicates the greatest need for continuing education in the following subject matter areas:

1. Food handling, storage, cost and labeling
2. Diet counseling and planning
3. Important nutrients for the elderly
4. Drug-nutrient interactions and abuse of nutrient supplements
5. Social-gerontological concepts

Data on education and work experience of the respondents revealed that 18 percent of the 134 public health nurses have taken course work beyond the bachelor's degree. Thirty-four percent of the group have obtained degrees in the last ten years. Continuing education units in nutrition have been acquired by 33 percent of the respondents in the last two years. Those who have less than 10 years experience as a public health nurse number 68 percent.

The greatest number of respondents reported that the most helpful sources of nutrition education materials are from Cooperative Extension Service and Volunteer Organizations, e.g., American Heart Association, at 89 and 88 percent, respectively. Closely following, most helpful

materials used are from professional books and journals and from the Department of Public Health at 78 and 76 percent. Materials considered least accurate, popular books and magazines and from commercial companies, are considered helpful by 60 and 47 percent of the respondents.

Nutrition information most often provided elderly clients falls within the nutrition in aging category which includes modified diets, food-drug interactions, and food supplements. Nutrition information on the lower end of the continuum reported as being provided most often is food safety, food labeling, and food facts and fallacies. Public health nurses prefer their professional continuing education delivered in face-to-face inservice education (98%), followed closely by newsletters (97%), and single concept leaflets (96%).

#### Recommendations

The purpose of this study was to assess the educational needs of Iowa public health nurses for nutrition counseling of the elderly using a questionnaire. The criterion-referenced test results have been used for determination of subject matter content for inservice education of nurses staffing Iowa Well Elderly Screening Clinics.

The following recommendations for future research resulting from this study are discussed in two segments: (1) replication of this study, and (2) suggestions for additional research.

(1) Replication of this study could be enhanced with increased funding. The findings could be further generalized to a larger population by expanding the existing study to other states.

Determination of timing to collect data when workload is lightest for public health nurses may improve response rate. Telephone follow-up responses suggested many were involved in planning financial budgets.

Greater emphasis on the importance of participating in the study is needed from Iowa Department of Health or Area Nursing Supervisors. County public health nurses were found to be very independent and often rude when responding to telephone follow-ups.

(2) The needs assessment model used in this study can be adapted for use in other subject matter content for public health nurses. A needs assessment in gerontology subject matter content combined with an assessment of attitudes toward the elderly is recommended for the registered nurses working in the WESC.

Attitudes and values clarification are appropriate for inclusion in a needs assessment. By including both cognitive and affective behaviors, a needs assessment can provide direction for continuing education programs in both domains.

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## ACKNOWLEDGEMENTS

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I want to express a very special thank you to my husband, Eldon, for his unending patience, support, and encouragement. He has been my friend and colleague.

Linda, Jim, Anne, and John, our four children, have provided continual support, understanding, and encouragement, as have their spouses, Lon, Jill, David, and Sandra. I thank them sincerely. And loving thanks to my grandchildren, Trevor, Andrea, Charlie, and A.J., for their understanding patience when my time for them was limited.

Recognition and appreciation is expressed to the Bureau of Nutrition and Health Promotion, Iowa Department of Public Health, for their financial support.

It is not possible to list all of my family members, friends, and colleagues who have contributed to attainment of this goal. I do thank them all for their supportive encouragement with special recognition given Dr. Jacqueline Dupont and Dr. Pilar Garcia whose confidence in me provided the motivation to work toward this goal.

**APPENDIX A:  
REFERENCES USED TO IDENTIFY CONCEPTS,  
WRITE TEST ITEMS**

REFERENCES USED TO IDENTIFY NUTRITION CONCEPTS.WRITE TEST ITEMS

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**APPENDIX B:  
AREA NURSING SUPERVISORS**

**PUBLIC HEALTH NURSING AND HOMEMAKER-HOME HEALTH AIDE  
COMMUNITY HEALTH CONSULTANTS' REGIONS**

<u>Region I</u> <u>Anna Snell</u>	<u>Region II</u> <u>Joana Hinrichs</u>	<u>Region III</u> <u>Carolyn Washburn</u>	<u>Region IV</u> <u>Sharon Bragg</u>	<u>Region V</u> <u>Jeanne Calkins</u>
Buena Vista	Audubon	Adair	Cerro Gordo	Butler
Cherokee	Boone	Adams	Chickasaw	Franklin
Clay	Calhoun	Cass	Emmet	Hamilton
Dickinson	Carroll	Decatur	Floyd	Hardin
Ida	Crawford	Fremont	Hancock	Humboldt
Lyon	Dallas	Mills	Howard	Marshall
O'Brien	Greene	Montgomery	Kossuth	Pocahontas
Osceola	Guthrie	Page	Mitchell	Story
Plymouth	Harrison	Pottawattamia	Palo Alto	Webster
Sioux	Monona	Ringgold	Winnebago	Wright
Woodbury	Sac	Taylor	Worth	
	Shelby	Union		

<u>Region VI</u> <u>Karen Fread</u>	<u>Region VII</u> <u>Nancy Crawford</u>	<u>Region VIII</u> <u>Maureen Morris</u>	<u>Region IX</u> <u>Sheryl Dodds</u>
Appanoose	Allamakee	Benton	Davis
Clarke	Black Hawk	Cedar	Des Moines
Jasper	Bremer	Clinton	Henry
Lucas	Buchanan	Iowa	Jefferson
Madison	Clayton	Johnson	Keokuk
Mahaska	Delaware	Jones	Lee
Marion	Dubuque	Linn	Louisa
Monroe	Fayette	Poweshiek	Muscatine
Polk	Grundy	Scott	Van Buren
Warren	Jackson	Tama	Wapello
Wayne	Winneshiek	Washington	

Joyce Bowdish, RN, MSN, GNP-C  
Geriatric Nurse Clinician  
Well Elderly Project  
Div. of Family and Community Health

Frances Jones, RN, Asst. Chief  
Public Health Nursing Bureau

Patricia Howell, Chief  
Homemaker-Home Health Aide Bureau



**APPENDIX C:  
NUTRITION CONCEPTS IDENTIFICATION**

64  
**IOWA STATE  
UNIVERSITY**  
  
**EXTENSION**  
Cooperative Extension Service

Home Economics  
Curtiss Hall  
Ames, Iowa 50011  
Telephone 515-294-6616

64

To: Iowa Public Health Nurse Supervisors

From: Carol L. Hans  
Carol L. Hans, M.S., R.D., L.D.  
Extension Nutrition Specialist

Iowa State University and the Nutrition Bureau, Iowa Department of Public Health, are jointly planning a research project to determine the nutrition information that would be of most help to public health nurses in their work with the elderly.

Will you please fill out the attached questionnaire and bring to the October 25, 1988 meeting? This information will help focus our thinking and discussion.

Dr. Alyce Fanslow, Distinguished Professor, Family and Consumer Sciences Education, and supervisor of the research, and I will be meeting with you at that time along with Susan Anthony and Connie Betterley.

Thank you for this help.

Enclosure

CLH/smw

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Iowa State University and U.S. Department of Agriculture cooperating

The Iowa Cooperative Extension Service's programs and policies are consistent with pertinent federal and state laws and regulations on nondiscrimination regarding race, color, national origin, religion, sex, age, and handicap.

Please bring to October 25, 1988, meeting.

65

Nutrition Education for the Elderly

We need to determine what nutrition information is most important for you to know as you work with elderly clients. Please mark the concepts as follows:

- G - for Great Importance
- M - for Moderate Importance
- L - for Little Importance

- \_\_\_\_\_ 1. Food/nutrition relationship to health
  - \_\_\_\_\_ 2. Use of food groups in meal planning
  - \_\_\_\_\_ 3. Food shopping
  - \_\_\_\_\_ 4. Interpretation of food labels
  - \_\_\_\_\_ 5. Meal preparation for one or two
  - \_\_\_\_\_ 6. Proper food storage techniques
  - \_\_\_\_\_ 7. Food sanitation
  - \_\_\_\_\_ 8. Kitchen safety/Cooking hazards
  - \_\_\_\_\_ 9. Nutritional problems of the aged
  - \_\_\_\_\_ 10. Modified Diets:
    - \_\_\_\_\_ Diabetes
    - \_\_\_\_\_ Exchange Plan
    - \_\_\_\_\_ Sodium Restricted
    - \_\_\_\_\_ Bland
  - \_\_\_\_\_ 11. Poor appetite
  - \_\_\_\_\_ 12. Food/Drug interactions
  - \_\_\_\_\_ 13. Poor dentition
  - \_\_\_\_\_ 14. Depression/social interaction relationship to food intake
  - \_\_\_\_\_ 15. Other:
16. Are you able to obtain continuing education in nutrition? \_\_\_\_ Yes \_\_\_\_ No  
If yes, where? \_\_\_\_\_  
how often? \_\_\_\_\_
17. Where do you obtain nutrition resources for your elderly clients?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
18. Other comments you may wish to add; please write on the back of this sheet.

**APPENDIX D:  
NUTRITION CONCEPTS RANKING**

NUTRITION EDUCATION  
for  
PUBLIC HEALTH NURSES

Nutrition education is a study to help individuals responsibly choose food and drink which is required for nourishing living systems (maintenance and activity of the human body). It also includes an in-depth understanding of eating behavior and the many beliefs and values unrelated to nutritional value that people attach to food. This definition will be used for purposes of the study I am conducting for Nutrition Bureau, Department of Public Health to assess the nutrition proficiency of public health nurses working in Well Elderly Clinics.

The information provided me at a meeting of public health nurse supervisors is categorized into broad concepts and sub-concepts within a framework to determine what considered to be the most important nutrition education needs of Public Health Nurses to be assessed.

Directions: Please review these broad concepts and mark the degree of importance of these concepts for Public Health Nurses, circling the appropriate number. If you believe there are others to add, please do so under "Others." Mark according to key:

- 1 - Highly Important
- 2 - Important
- 3 - Undecided
- 4 - Unimportant
- 5 - Highly Unimportant

Broad Concepts:

(1) Food in the Marketplace	1	2	3	4	5
(2) Food Safety	1	2	3	4	5
(3) Quality and Preparation of Food	1	2	3	4	5
(4) Nutrition in Aging	1	2	3	4	5
(5) Others					
_____	1	2	3	4	5
_____	1	2	3	4	5

Next repeat the process; please review the sub-concepts in each category. Mark their degree of importance and add "Others" if you consider them important.

Key: 1 - Highly Important  
 2 - Important  
 3 - Undecided  
 4 - Unimportant  
 5 - Highly Unimportant

Sub-concepts:

Food in the Marketplace

Supermarket Environment/Marketing	1	2	3	4	5
Food Label Information	1	2	3	4	5
Food Selection	1	2	3	4	5
Choosing Convenience Foods	1	2	3	4	5
Food Cost-cutting	1	2	3	4	5
Others	1	2	3	4	5
_____	1	2	3	4	5
_____	1	2	3	4	5
_____	1	2	3	4	5

Food Safety

Food Sanitation	1	2	3	4	5
Food Storage	1	2	3	4	5
Food Transportation	1	2	3	4	5
Kitchen Clean-Up	1	2	3	4	5
Small Appliance Use	1	2	3	4	5
Others	1	2	3	4	5
_____	1	2	3	4	5
_____	1	2	3	4	5
_____	1	2	3	4	5

Quality and Preparation of Food

Commodity Foods	1	2	3	4	5
Food Preparation Techniques	1	2	3	4	5

Menu Planning 69 1 2 3 4 5

Key: 1 - Highly Important  
2 - Important  
3 - Undedicated  
4 - Unimportant  
5 - Highly Unimportant

Kitchen Safety 1 2 3 4 5

Techniques for Disabled, Handicapped Persons 1 2 3 4 5

Fast and Processed Foods 1 2 3 4 5

Others  
\_\_\_\_\_ 1 2 3 4 5

\_\_\_\_\_ 1 2 3 4 5

\_\_\_\_\_ 1 2 3 4 5

Nutrition in Aging

Food and Drug Interactions 1 2 3 4 5

Vitamin and Mineral Supplements 1 2 3 4 5

Dentition 1 2 3 4 5

Appetite/Social Interaction/Depression 1 2 3 4 5

Chronic Disease 1 2 3 4 5

Key Nutrients 1 2 3 4 5

Food and Nutrition Relationship to Health 1 2 3 4 5

Modified Diets 1 2 3 4 5

Food Facts and Fallacies 1 2 3 4 5

Others  
\_\_\_\_\_ 1 2 3 4 5

\_\_\_\_\_ 1 2 3 4 5

\_\_\_\_\_ 1 2 3 4 5

**Additional Ideas and Comments:**

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**Thank you for your time in providing this information.**

**Carol L. Hans  
Extension Nutrition Specialist  
Iowa State University**



APPENDIX E:  
NUTRITION QUESTIONNAIRE FOR  
PUBLIC HEALTH NURSES



TERRY E. BRANSTAD, GOVERNOR

DEPARTMENT OF PUBLIC HEALTH  
MARY L. ELLIS, DIRECTOR

January 8, 1990

Dear Public Health Nurse:

The Bureau of Nutrition and Health Promotion is working with Carol Hans, graduate student at Iowa State University, to conduct a study of public health nurses' training needs in the area of nutrition and the elderly. Results from this study will be used to plan in-service training and resource materials for public health nurses working primarily with the well elderly.

You've been selected to participate in this study, which will take approximately 45 minutes to complete. Your responses will remain confidential and results will be summarized only for the total group.

May we ask that you block out 45 minutes during the next week on your calendar to respond to this questionnaire? Please return ONLY the answer sheet in the self-addressed envelope. Leave the cardboard in the envelope so the answer sheet remains flat.

If you have any questions, please phone Carol Hans at 515/294-6616. Thank you for your participation.

Sincerely,

Connie Betterley  
Community Nutritionist  
Bureau of Nutrition and  
Health Promotion

Carol Hans  
Extension Nutrition Specialist  
Iowa State University

73  
NUTRITION QUESTIONNAIRE  
FOR ①  
PUBLIC HEALTH NURSES

**MULTIPLE CHOICE:** Read each item carefully. Choose the **BEST ANSWER FOR EACH ITEM** and indicate your answer by darkening the letter on the answer sheet corresponding to your answer. Choose only one answer for each question. Please complete all items even though you may be uncertain of the answer. Please do not use a reference.

1. A client avoids eating dark, green leafy vegetables. What nutrient is most likely to be missing from the diet?
  - a. Vitamin B-6
  - b. Vitamin C
  - c. Vitamin B-12
  - d. Folate
  
2. Food selection recommendations to the arthritic client should usually include
  - a. selection of low calorie foods.
  - b. wise selection of easy-to-prepare foods.
  - c. regular intake of vitamin and mineral supplements.
  - d. elimination of arthritis-causing foods.
  
3. Which food modification should be a "last resort" for clients with dental problems?
  - a. Pureed foods
  - b. Fresh fruits cut into small pieces
  - c. Cooked vegetables
  - d. Well-cooked eggs, fish, chicken, meat
  
4. Which phrase **BEST** describes food selection by low-income elderly as compared with low-income younger households?
  - a. A larger proportion of total income is spent on food.
  - b. A smaller proportion of income is spent on fruits and vegetables.
  - c. A larger proportion of income is spent on prepared foods.
  - d. A smaller proportion of income is spent on bread and cereals.
  
5. Recommendations to an elderly diabetic would likely be to
  - a. reduce carbohydrate intake.
  - b. increase dietary fiber and fluids.
  - c. avoid snacking.

---

① Developed by Carol L. Hans, Extension Nutrition Specialist,  
Iowa State University.

6. Mineral oil taken in excess as a laxative interferes with absorption of fat-soluble vitamins and
  - a. zinc.
  - b. phosphorus.
  - c. iron.
  - d. calcium.
7. A legitimate protective health recommendation for the elderly American population is a
  - a. 25% increase in nutrient density of food intake.
  - b. vitamin E supplementation.
  - c. vitamin C supplementation.
  - d. high daily intake of vitamin A rich foods.
8. Riboflavin is most sensitive to
  - a. heat.
  - b. cold.
  - c. light.
9. A typical food intake practice of older single men is
  - a. high fruit and vegetable consumption.
  - b. high milk consumption.
  - c. high energy intake.
  - d. highly varied diet.
10. Which food is the best choice for an elderly client on a fat-modified diet?
  - a. Granola cereal
  - b. Snack crackers
  - c. Luncheon meat
  - d. Poached egg
11. Some diuretics may cause depletion of
  - a. iron.
  - b. calcium.
  - c. potassium.
  - d. magnesium.
12. Which of the following meat cuts is NOT considered to be lean?
  - a. Rib roast
  - b. Beef sirloin
  - c. Pork loin roast
  - d. Processed ham
13. Vitamin D toxicity is likely to occur from
  - a. drinking large amounts of vitamin D fortified milk.
  - b. taking high dosage vitamin D supplements.
  - c. eating liver two times per week.
  - d. eating fish four times per week.

14. Which food found in a client's refrigerator is unsafe to use?
  - a. Opened jar of mayonnaise nine months old
  - b. Mustard with a black crusty ring on jar rim
  - c. Unopened vacuum pack of hot dogs ten days old
  - d. Peach with one spot of mold on side
  
15. The best food sources of iron are
  - a. potato and citrus fruit.
  - b. leafy green and deep-yellow vegetables.
  - c. bread and pasta.
  - d. red meat, poultry, and fish.
  
16. Which Exchange Group includes angel food cake, sherbet, and sugar-free pudding made with skim milk in the Diabetic Food Exchange Lists?
  - a. Starch/bread exchange
  - b. Fat exchange
  - c. Milk exchange
  - d. Vegetable exchange
  
17. A client consumed 1500 calories yesterday including 70 grams of fat. She wonders if her fat intake is too high. What percentage of her calorie intake was fat?
  - a. 19%
  - b. 30%
  - c. 42%
  - d. 53%
  
18. The meaning of the U.S. RDA on food labels is defined as the
  - a. same as the Recommended Dietary Allowances tables.
  - b. minimum daily requirement.
  - c. average requirement of an adult woman.
  - d. single set of high values from the RDA tables.
  
19. Which recommendation is most likely to help the lactose-intolerant client?
  - a. Drink milk in small quantities often.
  - b. Substitute buttermilk for 2% milk.
  - c. Avoid drinking milk with meals.
  - d. Avoid aged cheeses.
  
20. Which person is at least risk for food-drug interactions?
  - a. One who uses only over-the-counter drugs
  - b. One in good protein nutriture
  - c. One who consumes milk with drug intake
  - d. One who combines drug intake with meals
  
21. Iron is best absorbed by the body from
  - a. grains.
  - b. starchy vegetables.
  - c. meats.
  - d. legumes.

22. When oil or fat catches fire in the kitchen, NEVER
  - a. use a small fire extinguisher.
  - b. use salt or baking soda to smother the flame.
  - c. cover with a pot cover.
  - d. throw water on the flame.
  
23. What is the safest refrigerator temperature?
  - a. 35 degrees F.
  - b. 40 degrees F.
  - c. 45 degrees F.
  - d. 55 degrees F.
  
24. The physiological changes of aging
  - a. may be altered by environmental factors such as nutrition.
  - b. occur at the same rate in all persons.
  - c. can be prevented with megadoses of nutrients.
  
25. What does "reduced calorie" mean?
  - a. Food is naturally low in calories.
  - b. Food is no more than 40 calories per serving.
  - c. Food contains at least 1/3 fewer calories than the food it resembles.
  - d. Food contains at least 1/2 fewer calories than the food it resembles.
  
26. Which of the following food practices could lead to Salmonella food poisoning?
  - a. Food preparer coughing and sneezing over food
  - b. Thawing frozen poultry in a microwave
  - c. Countertop contaminated by raw poultry but washed thoroughly with hot soapy water
  - d. Extremely hot food promptly refrigerated
  
27. Iron in enriched cereal will be better absorbed when cereal is eaten with
  - a. whole wheat toast.
  - b. hot tea.
  - c. milk.
  - d. orange juice.
  
28. The term "expiration date" means
  - a. the date the food was packed.
  - b. the last date the food should be sold.
  - c. the last date the food should be eaten or used.
  - d. the last date the food is optimally fresh.
  
29. The vegetable oil which contains the most saturated fat is
  - a. palm oil.
  - b. olive oil.
  - c. corn oil.
  - d. safflower oil.

30. Recommending a vitamin/mineral supplement is LEAST appropriate for elderly who
  - a. have recently undergone surgery.
  - b. eat monotonous diets.
  - c. want a "safety factor."
  - d. have low energy intakes.
  
31. Which of the following foods contains poor quality protein?
  - a. Gelatin
  - b. Meat
  - c. Rice
  - d. Egg
  
32. The strongest determinant of food choices by the elderly is usually
  - a. perceived health benefit.
  - b. convenience.
  - c. price.
  - d. education.
  
33. A recommended weight-loss practice for the elderly includes
  - a. no snacking.
  - b. maximum weight-loss of 1-2 pounds weekly.
  - c. avoidance of favorite high calorie foods.
  - d. daily weighing.
  
34. Low income elderly spend a greater proportion of their food money on
  - a. fruits and vegetables.
  - b. meat, fish, poultry.
  - c. dairy products.
  - d. cereals and baked products.
  
35. Which distinguishing feature of generic labeled foods as compared to brand names is unreliable?
  - a. Price
  - b. Packaging
  - c. Uniformity of product
  - d. Nutrient content
  
36. Lead in foods is usually from
  - a. farm animals and fish.
  - b. insecticides and fertilizers.
  - c. water pipes and food storage containers.
  - d. food can seals and air pollution from gasoline.
  
37. A client is drinking soft water. A concern about this practice is increased consumption of
  - a. sodium.
  - b. calcium.
  - c. magnesium.
  - d. cadmium.

Answer questions 38-41 using the information in the label below.

Nutrition Information (per serving)  
Serving Size = 1 C  
Servings per Container = 24

	Cereal + Butter, Milk, Wheat, Salt*	
	Cereal	
Calories	140	280
Protein (g)	4	6
Total carbohydrates (g)	30	32
Simple sugars (g)	25	27
Complex carbohydrates (g)	5	5
Fat (g)	0	14
Sodium (mg)	460	975

Percentage of U.S. Recommended Daily  
Allowances (U.S. RDA)

Protein	4	8
Vitamin A	2	10
Vitamin C	30	30
Thiamin	10	15
Riboflavin	2	8
Niacin	10	10
Calcium	2	4
Iron	4	4

\*Prepared according to recipe on back of package.

38. The prepared cereal + butter, milk, and salt from the above label provides the greatest source of
  - a. protein.
  - b. thiamin.
  - c. riboflavin
  - d. iron.
39. Riboflavin content is increased from the addition of
  - a. butter.
  - b. milk.
  - c. salt.
40. The U.S. RDA for an older female requires 18 milligrams iron daily. How many milligrams does 1 1/4 cups cereal provide?
  - a. 0.50 milligrams
  - b. 0.75 milligrams
  - c. 0.90 milligrams
  - d. 1.20 milligrams
41. Which nutrient had the largest increase with the addition of butter and milk?
  - a. Protein
  - b. Vitamin A
  - c. Thiamin
  - d. Riboflavin



42. Which food is most likely to contain nutrient additives?
- Snack food
  - Canned fruit
  - Processed meat
  - Salt
43. A client with asthma can safely consume
- salad bar vegetables.
  - wine.
  - grapes.
  - all prescription/OTC drugs.
44. Sociological aspects of food selection affects food safety for the elderly in use of
- canned foods.
  - dehydrated foods.
  - packaged mixes.
  - fresh and frozen ingredients.
45. The best choice to provide additional protein to a meal is
- baked custard.
  - oatmeal cooky.
  - fruit gelatin.
  - apple cake.
46. A client ate 1/2 cup baked beans for lunch which contains 8 grams protein, 6 grams fat, and 27 grams carbohydrate. How many kilocalories did she consume in the beans?
- 164 kilocalories
  - 194 kilocalories
  - 204 kilocalories
  - 369 kilocalories
47. The best choice for most elderly people who take vitamin/mineral supplements is
- a supplement from natural sources.
  - a therapeutic supplement greater than 200% of the RDA.
  - a balanced multivitamin 50-150% of the RDA.
  - a single nutrient supplement.
48. Which of the following can lead to anemia?
- Daily intake of 25 grams dietary fiber
  - Antacid abuse
  - Diet high in grains/legumes/citrus fruits
  - High stomach acidity
49. Vitamin E deficiency is rarely seen in the elderly because it is
- taken frequently as a vitamin E supplement.
  - synthesized in the body.
  - available in many foods.
  - fat soluble.

50. Which of the following meals contains the most dietary fiber?
- Roast chicken, mashed potatoes, green beans, fruit cocktail
  - Baked potato with skin, broccoli, whole wheat bread, apple and banana fruit cup
  - Poached egg on toast, milk, canned peaches
  - Hamburger on bun, macaroni and cheese, grapes, pudding
51. Margaret is hypertensive and overweight. Her physician prescribed a low-sodium, low-fat diet, but did not give her a diet plan. She likes to eat at fast food restaurants with her friends. Which of the following is Margaret's best choice considering calories, fat, and sodium?
- Roast beef sandwich
  - One slice cheese pizza
  - One taco
  - One regular hamburger, plain
52. Which of the following foods contain the largest amount of zinc?
- Baked beans
  - Dried fruits
  - Dark green vegetables
  - Whole wheat bread
53. Chelation therapy is a legitimate treatment for
- cardiovascular disease.
  - osteoporosis.
  - heavy metal poisoning.
  - anemia.
54. Which of the following foods is safe to eat?
- Homemade eggnog
  - Lettuce moistened by poultry drippings but outer leaves removed
  - Shriveled peanuts
  - Beef thawed, refrozen, and thawed all in refrigerator
55. One criterion for safe food-handling is
- cooking possibly salmonella-contaminated food to well-done.
  - storing perishable food at 45 degree F. temperature.
  - covering infected cuts with bandages.
  - holding perishable food at room temperature for 3 hours.
56. Which practice is unsafe when using eggs?
- Consuming eggs stored 4 weeks in the refrigerator
  - Storing unwashed eggs in their original carton
  - Eating lightly cooked foods containing eggs such as soft custard, meringues, and French toast
  - Eating eggs cooked seven minutes

57. Taste sensitivity is affected by all of the following nutrients EXCEPT
- zinc.
  - folacin.
  - vitamin A.
  - protein.
58. A client says she won't drink milk. Which of the following foods would you suggest as the safest, most economical calcium source?
- Broccoli
  - Cheddar cheese
  - Dried skim milk
  - Tums
59. The nutritional assessment method most practical for use with large groups of people is the
- blood diagnostic test.
  - diet history.
  - anthropometric measure.
  - hair analysis.
60. An elderly client on a limited food budget needing adequate protein should usually avoid which choice of foods?
- Leafy vegetables with whole grains
  - Red beans and rice
  - Ground round steak and potatoes
  - Bean and barley soup
61. Which ground beef is unsafe to use for consumption?
- Cooked "rare" hamburger
  - Raw meat that's turned brown after 2 days in refrigerator
  - Meat loaf baked to 170 Degrees F. internal temperature
  - Frozen meat thawed in refrigerator, used the following day
62. The RDA for energy
- represents a guide for carbohydrate and fat.
  - represents needs of the "average" person.
  - represents calorie levels of real people.
  - represents a low activity level.
63. Which of the following foods is safe to serve?
- An unpeeled potato with a greenish cast
  - A baked potato left out on the counter overnight
  - Cooked shrimp that was never "deveined"
  - Frozen ham that was thawed on the counter
64. Which food-handling procedure helps ensure safe food?
- Heating leftovers to lukewarm temperature
  - Cooling hot casseroles in refrigerator
  - Marinating meat in lemon juice, wine, vinegar at room temperature
  - Holding food on warming tray at warm temperature

65. A client consumed 1800 calories Monday, including 54 grams of protein. What percentage of her calorie intake was protein?
- 12%
  - 16%
  - 20%
  - 22%
66. Processed foods are a generous source of
- potassium.
  - sodium.
  - iron.
  - B vitamins.
67. The herbal tea safe for limited consumption is
- sassafras.
  - wormwood.
  - comfrey.
  - raspberry leaf.
68. A client asks what purpose the food additives BHA/BHT serve?
- Retards food spoilage
  - Adds flavor
  - Stabilizes ingredients
  - Maintains freshness
69. A food product is labeled "low sodium". This means
- less than 5 milligrams per serving.
  - 35 milligrams or less per serving.
  - 140 milligrams or less per serving.
  - processed to reduce the usual level of sodium 75%.

Answer question 70 using the information in the label below.

**INFORMATION PANEL**

INGREDIENTS: CABBAGE, TOMATOES, BEEF, WATER, COOKED WHITE RICE, TOMATO PUREE, ONIONS, ZUCCHINI, PORK, CARROTS, BREAD CRUMBS, BROWN SUGAR, MARGARINE, MODIFIED CORNSTARCH, SUGAR, SALT, WORCESTERSHIRE SAUCE, CONCENTRATED BEEF STOCK, MUSHROOM BASE (SAULT (E) MUSHROOMS; SALT, WATER; SHREDDED MUSHROOMS, DRIED HYDROLYZED PLANT PROTEIN, SUGAR, AND FLAVORING); CARAMEL COLORING, NATURAL FLAVORINGS, MONOSODIUM GLUTAMATE, CORN OIL, XANTHAN GUM, DEHYDRATED ONIONS, ERYTHRIBIC ACID, SPICES.

70. The ingredient contained in greatest amount according to the food label is
- beef.
  - cabbage.
  - mushroom base.
  - spices.

71. For which elderly clients would weight reduction NOT be recommended?
- Body weight 20% in excess of height-weight tables
  - Hypertension
  - Hypercholesterolemia
  - Body weight 10% in excess of height-weight tables
72. A loss of vitamin D associated with lack of nutrient intake and sunshine is associated with the bone disease
- Paget's disease.
  - osteoporosis.
  - osteomalacia.
  - arthritis.
73. Which delayed physiological reaction to mild illness will the aging exhibit?
- Increased thirst response.
  - Decreased blood sodium levels.
  - Increased ability to concentrate urine.
  - Decreased thirst response.
74. Successful treatment to retard osteoporosis for most postmenopausal women includes use of
- calcium supplementation.
  - low dose estrogen-progestin.
  - combination calcium and vitamin D supplementation.
  - calcium-fortified foods.
75. Food provides more protection to the health of the elderly if
- irradiated.
  - fewer nutrient-dense foods are consumed in larger quantities.
  - the diet is adequate or optimal.
  - the diet is enhanced with synthetic vitamin supplements.
76. The most common nonorganic mental disorder in the elderly is
- schizophrenia.
  - depression.
  - anxiety.
  - paranoia.
77. Rural elderly in Iowa are characterized by
- improved nutritional status through Congregate Meals.
  - physical abuse from caregivers.
  - isolation from family and friends.
  - isolation from health care.
78. Treatment of chronic disease in the U.S. today emphasizes the
- medical model.
  - social model.
  - holistic model.
  - residential treatment model.

79. Ageism is defined as
- a. the normal process of growing old.
  - b. the state of being old.
  - c. prejudice against people because they are old.
  - d. the changes that occur normally with growing older.
80. The most frequent mistake elderly make with prescription drugs is
- a. taking too much medication.
  - b. not taking the medication.
  - c. improper sequencing.
  - d. incorrect dosage.

PLEASE CONTINUE ON TO THE NEXT PAGE.....

## SECTION II

Complete this section by darkening the letter corresponding to the correct answer. Please complete the entire section.

81. Highest level of formal education
- LPN
  - 2 year nursing degree
  - 3 year nursing degree
  - 4 year nursing degree (B.S.N.)
  - B.S.N. +
  - M.S. nursing degree
82. Number of years since completing last degree
- 0-10 years
  - 11-20 years
  - 21-30 years
  - 31-40 years
  - Over 40 years
83. Number of semester hours in nutrition acquired in past 2 years
- 0 hours
  - 1-6 hours
  - 7-9 hours
  - over 10 hours
84. Number of C.E.U.'s in nutrition acquired in the past 2 years
- 0
  - 1-6
  - 7-9
  - 10-12
  - Over 12
85. Number of years worked as a Public Health Nurse
- 0-10 years
  - 11-20 years
  - 21-30 years
  - 31-40 years
  - Over 40 years
86. Percentage of case load made up of elderly clients
- 0
  - 1-25 percent
  - 26-50 percent
  - 51-75 percent
  - 76-99 percent
  - 100 percent
87. Number of years of work experience with the elderly
- 0-10 years
  - 11-20 years
  - 21-30 years
  - 31-40 years
  - Over 40 years

88. Elderly relative resides or has resided in your home  
 a. yes  
 b. no

If "yes",

89. Number of years elderly relative has lived in your home.  
 a. 1-5 years  
 b. 6-10 years  
 c. 11-15 years  
 d. 16-20 years  
 e. Over 20 years

Mark items 90-96 using the following code

- A Very Helpful  
 B Helpful  
 C Not Helpful  
 D Do Not Use

My source of nutrition education materials

90. Department of Public Health  
 91. Cooperative Extension Service/USDA  
 92. Commercial companies  
 93. Volunteer organizations (such as American Heart Association)  
 94. Commodity groups (such as Beef/Pork/Dairy)  
 95. Popular books or magazine  
 96. Professional books or research journals

Mark items 97-115 using the following code

- A Very Helpful  
 B Helpful  
 C Not Helpful

What inservice education would be helpful in your position?

97. Food labeling  
 98. Food storage, sanitation and safety  
 99. Food preparation techniques for one or two  
 100. Food preparation techniques for disabled, handicapped persons  
 101. Food-drug interactions



102. Food supplements 87  
103. Nutrition in chronic disease  
104. Modified diets  
105. Food facts and fallacies

Mark items 106-110 using the following code

- A Very Helpful
- B Helpful
- C Not Helpful

What delivery modes for receiving nutrition education are most useful to you?

106. Newsletter  
107. Face-to-face inservice education  
108. Individual consultations  
109. Resource Manual  
110. Single concept leaflets

Mark items 111-118 using the following code

- A Very Often
- B Often
- C Not often

What kinds of nutrition information do you provide your elderly clients most often?

111. Food labeling  
112. Food storage, sanitation and safety  
113. Food preparation techniques for the elderly  
114. Food-Drug interactions  
115. Food supplements  
116. Nutrition for the elderly  
117. Modified diets  
118. Food facts and fallacies

PLEASE BE SURE YOU HAVE ANSWERED ALL THE QUESTIONS.....  
THANK YOU FOR PARTICIPATING IN THIS STUDY.

Answers to Questionnaire

<u>Item Number</u>	<u>Answer</u>	<u>Item Number</u>	<u>Answer</u>
1	d	25	c
2	b	26	a
3	a	27	d
4	a	28	c
5	b	29	a
6	d	30	c
7	a	31	a
8	c	32	d
9	b	33	b
10	d	34	d
11	c	35	c
12	a	36	d
13	b	37	a
14	d	38	b
15	d	39	b
16	a	40	c
17	c	41	b
18	d	42	d
19	a	43	a
20	b	44	d
21	c	45	a
22	d	46	b
23	b	47	c
24	a	48	d

Answers continued

<u>Item Number</u>	<u>Answer</u>	<u>Item Number</u>	<u>Answer</u>
49	c	74	b
50	b	75	c
51	c	76	b
52	a	77	d
53	c	78	a
54	d	79	c
55	a	80	b
56	c		
57	d		
58	c		
59	b		
60	c		
61	a		
62	b		
63	c		
64	b		
65	a		
66	b		
67	d		
68	a		
69	c		
70	b		
71	d		
72	c		
73	d		

**APPENDIX F:**  
**UNIVERSITY HUMAN SUBJECTS APPROVAL**

INFORMATION ON THE USE OF HUMAN SUBJECTS IN RESEARCH  
IOWA STATE UNIVERSITY

(Please follow the accompanying instructions for completing this form.)

91

1. Title of project (please type): Nutrition Education Needs of Iowa Public Health  
Nurses Providing Health-Related Services to Low-Income Elderly

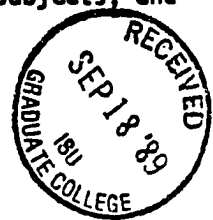
2. I agree to provide the proper surveillance of this project to insure that the rights and welfare of the human subjects are properly protected. Additions to or changes in procedures affecting the subjects after the project has been approved will be submitted to the committee for review.

Carol L. Hans 9/12/89 Carol L. Hans  
Typed Name of Principal Investigator Date Signature of Principal Investigator  
B-5 Curtiss 294-6616  
Campus Address Campus Telephone

3. Signatures of others (if any) Date Relationship to Principal Investigator  
Alyce M. Fandow 9/12/89 Major Professor

4. ATTACH an additional page(s) (A) describing your proposed research and (B) the subjects to be used, (C) indicating any risks or discomforts to the subjects, and (D) covering any topics checked below. CHECK all boxes applicable.

- Medical clearance necessary before subjects can participate
- Samples (blood, tissue, etc.) from subjects
- Administration of substances (foods, drugs, etc.) to subjects
- Physical exercise or conditioning for subjects
- Deception of subjects
- Subjects under 14 years of age and(or)  Subjects 14-17 years of age
- Subjects in institutions
- Research must be approved by another institution or agency



5. ATTACH an example of the material to be used to obtain informed consent and CHECK which type will be used.  
 Signed informed consent will be obtained.  
 Modified informed consent will be obtained.

6. Anticipated date on which subjects will be first contacted: 

Month	Day	Year
<u>11</u>	<u>13</u>	<u>89</u>

  
Anticipated date for last contact with subjects: 

Month	Day	Year
<u>12</u>	<u>18</u>	<u>89</u>

7. If Applicable: Anticipated date on which audio or visual tapes will be erased and(or) identifiers will be removed from completed survey instruments:  

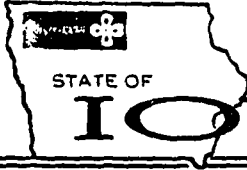
Month	Day	Year

8. Signature of Head or Chairperson Date Department or Administrative Unit  
A. Crow 9/17/89 Family & Consumer Sciences Education

9. Decision of the University Committee on the Use of Human Subjects in Research:

Project Approved  Project not approved  No action required  
George G. Karas 10-12-89 [Signature]  
Name of Committee Chairperson Date Signature of Committee Chairperson

**APPENDIX G:  
NONRESPONDENTS REMINDER LETTER**



TERRY E. BRANSTAD, GOVERNOR

DEPARTMENT OF PUBLIC HEALTH  
MARY L. ELLIS, DIRECTOR

January 30, 1990

Dear Public Health Nurse:

You recently received a questionnaire on nutrition and the elderly. If you have already completed and returned it, we want to thank you for your participation.

As health professionals, you can appreciate the importance of a high return rate to generate valid conclusions for assisting you in your work.

This reminder is being sent to all persons in the sample. If you have not already done so, we encourage you to complete the questionnaire and return it as soon as possible. If you have misplaced yours, please call Carol Hans at (515)294-6616 to obtain another copy.

Sincerely,

Connie Betterley, M.S., R.D.  
Community Nutritionist

Carol L. Hans  
Extension Nutrition Specialist

CB:CL:jc