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Utilizing Algorithms and Pathways of Care in Allied Health Practice

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ABSTRACT

Examined are the use of algorithms and pathways of care in the provision of health promotion activities and clinical services in Allied Health. Practitioners regardless of discipline must know and understand the importance of standards of care and models of intervention and evaluation in clinical practice. Examined is the development and use of clinical algorithms and care pathway for allied health practice. Provided is a case study with a case history and clinical algorithm developed for this case. Offered are issues and import for future paradigm shifts in allied health practice.

INTRODUCTION

Patient care planning requires considerable attention for the allied health professionals in health care. Among the critical factors are the consideration of client needs and desires, psycho-social considerations, diet and exercise selection, and the potential risks and benefits of the selected program. In addition to this, attention must be given to the clients understanding and processing of the plan and therapeutic program provided.

Processing of health information is critical to the success of any therapeutic intervention. Traditional health-education materials contain information that is the same for every recipient, a kind of one-size-fits-all approach. With the advent of new computer technologies, a different approach to constructing health-education materials has emerged. Materials are not mass-produced, but rather generated on an individualized bases. Psychosocial and behavioral data are gathered from individuals and entered into a computer program that determines which health messages from among a library of possibilities are most appropriate for each individual.

The Elaboration Likelihood Model (ELM) provides a theoretical rationale for tailored communication.¹ According to this model, individuals are more likely to actively and thoughtfully process information by engaging in what the authors refer to as central-route processing if they perceive it to be personally relevant. ELM is based on the premise that under many conditions, people are active information processors—considering messages carefully, relating them to other information they have encountered and comparing them with their own past experiences. Research has shown that messages processed in this way tend to be retained for a longer period of time and are more likely to lead to permanent change than messages that are not elaborated upon.²

Evidence-based decision-making in the clinical design of a health education program suggest that the tailored educational materials elicit (a) greater attention, (b) greater comprehension, (c) greater likelihood of discussing the content with other people, (d) greater intention to change the behaviors addressed by the content, and (e) greater likelihood of behavior change.³ Several research studies suggest that the design and composition of a health care professional's message is more likely to be read and remembered, saved, discussed with other people, and perceived by readers as interesting, personally relevant, and having been written especially for them if it is tailored to the individual needs of the patient.⁴⁻⁷

Bull, Kreuter, and Scharff assessed the relative effects of tailoring and personalization.⁸ Adult primary-care patients were randomly assigned to one of three groups that received health education materials or to a usual-care control group. Findings showed that the tailored and personalized information were perceived as more personally relevant than the general materials, whether personalized or not, and those patients that received the personalized, tailored materials increased their health promotion activities more than the other experimental groups or the control group. In most cases, the general, personalized information was rated least favorably, suggesting it is unlikely that personalization alone accounted for tailoring effects observed in previous studies.

In another study, Kreuter, Bull, Clark, and Oswald, studied 198 overweight men and women. They were randomly assigned to receive either tailored or non-tailored educational information on weight loss.⁹ Participants completed a brief survey about their weight-related goals, beliefs, and behaviors, and then received one of three types of weight loss information. The first was tailored specifically to their responses on the survey. The second was a generically prepared brochure on weight loss, produced by the American Heart Association. The third covered the same content as the second, but was formatted to look exactly like the tailored materials. Inclusion of this latter condition provided a mechanism for assessing whether it was the content or some other attribute of the tailored messages that led to the outcomes realized in the study.

Results suggest that the ELM model is a central-route information process that improved cognitive processing which realized that tailored materials were superior to the non-tailored materials. Reanalysis of the data from the weight-loss study confirmed this finding.¹⁰ All participants who received non-tailored information were classified into one of three categories based on how well the content fit with their individual need. On a variety of cognitive, affective, and behavioral measures (e.g., attention given to the materials, positive cognitive responses, choosing low-fat foods), good-fitting non-tailored materials had outcomes as good as or even better than the outcomes for tailored materials. At the same time, moderate-and-poor-fitting non-tailored materials were usually inferior to both approaches overall.

STANDARDS OF CARE

Care pathways, algorithms, and practice guidelines have been employed by the health care industry to provide a standard flowchart of the evidence-based diagnostic and treatment to be provided for a spectrum of diseases and disorders.¹¹ There is considerable evidence in the health care literature that the use of care pathways based in clinical research will help in standardizing care and providing the necessary ingredients for effective diagnostic and counseling interventions.¹²⁻¹⁴ The goal is to provide the client with an evidence-based standard of health care delivery.¹⁵ To the extent that this is successful, five components occur: (a) the guideline is used and becomes a standard of practice, (b) multidisciplinary professionals can use it to anticipate care events, (c) clinicians can use it as a shorthand or outline to guide their decisions and their communications to others, (d) the logistics for delivering the guideline components are convenient and reliable, and (e) the guideline defines the measure of performance and incorporates information collected that can be used for its evaluation and improvement. The tailored individualized treatment plans that clinicians may use in clinical practice contribute information for guideline revision.

Allied health practitioners recognize the importance of standards of care and standardized models of intervention and evaluation. Examined is a care pathway guideline developed to ensure consistency in the treatment and evaluation offered where the spectrum of symptoms are identified in the course of screening and counseling patients. Since tailoring a practice guideline to the specific needs of a patient is shown to be beneficial through the ELM model, it would seem necessary for allied health practitioners to know and understand the process employed in developing and modifying algorithms and pathways of care.

Algorithm and Care Pathway Development

Algorithms are developed and used to provide a map of logical and sequential steps toward effective case management. In today's world, accountability is a top priority for all allied health professionals. Case management through the use of clinical algorithms presents a systematic perspective. Algorithms attempt to answer the questions, "What is the best way to systematically handle this problematic condition?" Algorithms have a problem solving orientation coupled with functional specific actions or critical pathways to be taken. If desired results are produced, the problem was managed effectively. If the desired results are not produced, adjustments can be made to achieve the desired results through modifying the algorithm to a specific patient's needs.

The point to be made is that in our professional roles as allied health practitioners, it is important to be a creative problem solver who can translate relevant research into functional interventions. Intervention approaches must be managed to assure relevant results. Thus, the practitioner has a process skill that is dynamic yet organized around solid principles and practices. This is not to imply that this is an easy process. The critical pathways that algorithms provide take time and energy to develop but they also provide a systematic methodology that can prove effective in dealing with critical problematic areas for the allied health practitioner who is developing a therapeutic intervention program.

Steps in Building an Algorithm:

- 1) Define the problem. Specify the patient's condition and tailor the needs of the patient in the algorithm.
- 2) Review the flow process of addressing the condition including all possible causes of the condition, and alternative strategies for diagnosis, patient education, management intervention and following up with the patient.
- 3) Present diagnostic, educational, therapeutic or management steps in a logical order:
  - a) Identify the presenting problem(s).
  - b) Indicate the Critical Questions
  - c) Provide Assessment, Patient Education, and Evidence based interventions.
  - d) Consider accuracy of the flow chart
  - e) Relegate unlikely causes of condition to a footnote.
- 4) Sequence alternately decision boxes and intervention boxes.
- 5) Present intervention in detail, including:
  - a. Formulate steps to monitor or confirm diagnosis or condition.
  - b. Specify interventions.
  - c. For the clinical case being addressed, specify evidence-based interventions.
  - d. Define end points of intervention (e.g., level of functioning; discharge; refer to specialist).
- 6) Use annotations and footnotes to:
  - a. Elaborate on the key point in the algorithm and, or define terms used in the algorithm (e.g., the "at risk" patient).
  - b. Explain what should be excluded in the algorithm and what is relevant that does not add to the clinical process.
  - c. Clarify a clinical rationale, using evidence-based citations.
  - d. Detail information about the problem intervention and/or decision made at each point in the algorithm.

Keeping these points in mind, the allied health practitioner can now address constructing a tailor-made practice guideline.

Basic Clinical Algorithm Construction

Clinical algorithms are composed of three differently shaped boxes:

1. The oval describes a clinical problem or diagnosis. What does the patient present to the practitioner?

2. The rectangular box describes an action to be taken or intervention to be provided.

3. The hexagonal box describes what clinical question has emerged leading to an evidence-based decision.

There are always two possibilities that follow the decision box. Each decision box must have two branches attached to it for a "Yes" and "No" decision. Based on the yes or no decision, options for each must be included in the decision making process summarized in the algorithm.

The Care Pathway

Care pathway guidelines delineate specific information and timelines in which diagnosis-treatment follow up should occur. They further address the decision-making process, who, what and when various actions relevant to the patient's condition occur, the clinical services offered, and the potential interactions among multidisciplinary health care professionals and providers for specific needs for patients referred.

Clinical information systems capable of supporting the functional requirements of a comprehensive care pathway offer the logical sequence of what is to occur and by whom.¹⁶ The care pathway for patients needing a specific therapeutic program involves several stages. Sometimes the patient will present with symptoms, complaints, or some other related symptomatology. The pathway moves through the history and systems review, the identification of symptoms, and the diagnostic criteria for acute and/or health status. It also considers symptoms, specific treatment options, and supportive care and how the clinician can reassess and monitor the clinical condition over time. Figure 1 summarizes a standardized flowchart that assists the allied health practitioner in completing a thorough diagnostic and intervention model.

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Figure 1: Model Guideline Flowchart for Health Care Planning

The care pathway delineates the specific timelines in which assessment and treatment interventions must occur. Note with specificity the importance of the diagnostic and treatment responsibilities for the condition. Specific emphasis here is on evidence-based decision-making both diagnostically and therapeutically. In addition, specific information related to clinical management for patients who present with specific problems unique to their case. These become the critical ingredients to be considered in a care pathway that would provide standardized care and treatment for the person in need of a therapeutic exercise program. Table 1 provides a care pathway that addresses what activity should be completed at various stages in the provision of a treatment interventions program tailor made for a specific patient's needs.

Table 1: Integrated Sample Care Pathway for a Therapeutic Dietary Program

ACTIVITY	VISIT 1	VISIT 2	VISIT 3-6	VISIT 8
ASSESSMENT	TDP Screening	Review results of screening	PRN Assessment of patient	TDP post Screening
INTERVENTION	TDP Plan is reviewed with patient	TDP focused Education Module for patient regarding exercise	Provide gradients of intervention for patients TDP	Consideration for further TDP or maintenance of present program
CONSULTS / ASSESSMENTS CONSIDERED	Internist Psychologist Cardiologist	Consider referral as needed	Integrate consultation recommendation into TDP	Review need for further consultation
CLIENT/FAMILY EDUCATION	Consider involving family or significant others in patients TDP	Meet with significant others to review patients TDP	Review with patient and family importance of supportive environment for patients TDP	Encourage client and family support for maintenance of patients TDP

TDP = Therapeutic Diet Program

Now that we have examined the algorithm and care pathway construction, it may be helpful to apply this to a specific patient.

CASE STUDY

History and Algorithm for Practice

Case History

J.T. is a 53-year-old Caucasian male who works in Boston as a sales representative for an insurance company. He lives with his wife in Massachusetts just outside of the city of Boston. He has four children, all of whom live at least 40 miles away from him. He also has two grandchildren, a 4-year-old boy and a 1-year-old girl. He stays in frequent contact with his family and visits them often, which means he takes frequent road trips. He likes his job and his daily activities, all of which are non-stressful.

J.T. changed providers due to an altercation with his previous physician. It was time for a yearly physical, so J.T. went in for his first appointment with the new physician. After the doctor asked him for his general background information, he proceeded with the physical exam. He took a routine blood pressure, which showed 145/97. When the physical was over, the doctor had J.T. get his blood work done.

When the physician received J.T.'s results, he found that along with his hypertension, he also had high blood sodium levels. From the physical, the doctor saw that J.T. was overweight. During the background information, J.T. told the doctor that he has a hiatal hernia along with a family history of high blood pressure. Due to the test results, the doctor referred him to a cardiologist and also advised him to see a dietitian.

The cardiologist discussed with J.T. his hypertension and what his values meant. Because J.T.'s hypertension is in Stage 1, the cardiologist aimed his treatment at life-style modification for at least 6 months. If this treatment would not work out for J.T., he would then be put on drug therapy.

The dietitian's goal was to develop an exercise program and diet modification. During J.T.'s appointment, they discussed his daily eating habits, his family history, his medical conditions, and pharmacological treatments available to him. J.T.

expressed his love for salt with every item in his diet and knew about the consequences, especially because hypertension runs in his family. Before they began with his anthropometric measurements, the dietician explained what the measurements were and what their ideal values were. The dietician then performed these anthropometric measurements using Body Mass Index (BMI) and waist-to-hip ratio. J.T. had a BMI of 38.2 and his waist-to-hip ratio was 1.62.

After a 24-hour recall was done over a period of three days, it showed that J.T. ate a diet high in fat and salt. He had very minimal vegetables in his diet and more than the threshold of 2 alcoholic beverages per day. It was decided that in order for J.T.'s conditions to improve they would need to alter his diet and add exercise into his daily activities. Together they altered his diet to include salt restrictions and a decrease in fat intake.

Because he was making a commitment to working out in the evening when he got home from work, J.T. decided that he would perform 3 intervals a week of 30 minutes of cardiovascular exercise. The dietician also educated him on other ways to include added exercise to his day, for instance, taking the train to a different location and walking a further distance to work in the morning. They set a goal of losing 10 lbs per month.

For his diet modification, although he loved his salt, J.T. agreed that restricting his consumption of salt would be best to improve his health. They restricted his intake to 1800mg/day or less. Also, his alcohol intake would be limited to no more than two drinks per day. Finally, his fat intake had to be decreased to less than 30% of his daily calorie intake with an increase in vegetables. J.T. was placed on the DASH diet, which increases his intake of fruits, vegetables, and non-dairy foods.

The algorithm and care pathway for practitioners summarizes the flow of assessment, education and counseling treatment intervention and follow-up that should be provided in the course of providing a clinical intervention and is summarized in Figure 2.

Continued on next page

Figure 2: Practice Guideline for Case Study of patient with Obesity Algorithm

Paradigm Shifts in Allied Health Practice

From traditional models, allied health practitioners, physicians and others have become part of the network of healthcare professionals required to use strict standards of practice to qualify for reimbursement of services. These shifts are driven by cost containment, capitation and contracts for services that focus on efficiency and use financial incentives to replace what has come to be known as fees for services by clinicians.

As we approach the challenges of the next decade, allied health professionals must begin to consider a number of the issues raised by Covey in the business world of healthcare.¹⁶ The endowments Covey discusses for clinicians are *self-awareness*, which is our capacity to stand apart from our wins and losses and examine our thinking, our understanding of the whole person and our motives and commitment to healthcare.¹⁷ The second human endowment is well recognized in the clinician's personal development and addresses the Jungian concept that is known as *conscience*. Covey argues that

conscience connects us with the wisdom gained over time and the understanding of human potential. It adds an ethical character component to what we bring to the clinical encounter.¹⁷ The third endowment is that of *independent wealth*, which is seen as our ability as clinicians to recognize all that we are capable of being and to act in the best interest of our patients. The fourth endowment is *imagination*, which is the power to envision creative innovation as clinicians and the direction for which we can provide our patients with creative and tailor-made programs and other interventions geared to their specific needs.

Allied Health professionals must engage fellow professionals and consumers through; (i) effective interpersonal skill development; (ii) new models of diagnostic and therapeutic management; (iii) quality tools for a spectrum of interventions (iv) clinical research that measures the effectiveness of the interventions provided. All of these shifts are within the repertoire of the allied health practitioner. We must begin to recognize that patient expectations and clinical outcomes must be the result of mutually discussed and agreed dimensions of clinical care. Some of the anticipated shifts practitioners might encounter are summarized in Table 2.

Table 2. Anticipated shifts in Allied Health Practice

	Present	Future
Organizational Paradigm	Traditional models and methods in health care delivery	Networks and alliances of practitioners and specialists contracting through integrated systems of health related programs at all levels
Communication and information systems	Paper records, individually developed profiles, record systems, local network accessibility, limited communication between practitioners	Electronic profiling and clustering clients by learning styles, genetic predisposition, on-line support systems, e-mail, electronic files, web pages with health promotion medical and health-related information systems
Assessment systems	Limited measures and assessment procedures for clients, paper and pencil screening; basic clinical assessment screening	Integrated networks of assessment that address genetic, physiological, psychological and biochemical markers; learning and cognitive styles through components-based integrated assessment systems
Interventions	Individualized interventions addressing stepwise interventions and motivation styles of clients	Integrated interventions based on genetic and biochemical markers using virtual reality models in diagnosis and training, and treatment with telehealth applications training activities for health promotion.
Prevention and wellness focus	Few incentives for health promotion or prevention-based initiatives for patients or families	Wellness; prevention interventions, incentives for patients, greater use of behavioral medicine and genetic counseling in health promotion

One might ask, what are the significant changes that are likely to emerge over the next decade?

- Allied health professionals will require a cutting edge understanding of the genetic interface with traditional models of diagnosis and treatment.
- Diagnostic evaluation, as we have known it, will be replaced by a more complex analysis system of networks which will analyze how genetic factors that influence motivation and behavior in clients is affected by intellectual and personality markers that result in patterns of compliance.
- Allied health professionals will, by necessity, need to be multi-skilled specialists providing a spectrum of clinical services to patients.
- Breakthroughs in technology, including new diagnostic models and intervention techniques, will impact treatment planning.

- Allied health 'supercenters' will feature medical health care, specialists, physical therapists, dieticians, exercise physiologists, medical screening, behavioral counseling and multi-disciplinary care and treatment under one roof – a mall of clinical health care.
- New alliances in medicine, education, psychology and science will emerge with allied health professionals as significant partners in treating the health care needs of patients.
- Databases will hold key information in addressing individualized patterns of therapeutic programming for patients.
- In Health and web based education and information, awareness and understanding become critical ingredients in improving 'quality of life' issues for patients with allied health practitioners providing a key role in this process.

Future directions in this area must address the models of therapeutic programming for patients with clinical guidelines and pathways of care based on the specific evidence-based strategies that have been found most effective in the diagnosis and treatment of a spectrum of conditions. Success of health promotion and prevention intervention programs will depend on allied health practitioners, as health care providers, making fundamental use of clinical models utilizing algorithms and pathways of care.

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