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Advising on Prevention in Chiropractic: A Look at Public Health Promotion and Health Behavior Theory Use in Clinical Education Settings

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Abstract

Chiropractic care is among the more commonly used Complementary and Alternative Medical (CAM) therapies. Spinal co-morbidities include many of the most common causes of premature death and disability. Health promotion and disease prevention have been used in the profession and taught in educational settings but not yet fully embraced in usual practice. This manuscript reviews areas in which health promotion has been emphasized in chiropractic education along with instances in which health behavior theories (HBTs) have been applied. Chiropractic clinical and educational programs should consider application of HBTs to move clinicians and interns forward regarding better advising roles with patients related to prevention and health promotion.

Introduction

The actual causes of death in the United States include many chronic diseases that are attributable to modifiable behavioral risk factors such as tobacco use, physical inactivity or sedentary lifestyle, alcohol consumption, poor nutrition or eating habits.¹ An increased emphasis on prevention, health promotion

(HP), and education has been recommended for decades but has failed to reduce many of the threats related to premature morbidity and mortality.^{2,3} Complementary and alternative medicine (CAM) use has also increased; in many cases aimed at chronic disease management.⁴⁻⁷

Chiropractic care is one of the most frequently used professional CAM health care systems in the U.S.^{4,5,7} Musculoskeletal conditions such as low back and neck pain, which are among the most common reasons patients visit medical physicians in the U.S.,⁸ are also among the conditions most frequently treated with chiropractic care.⁷⁻⁹ The relative efficacy and cost effectiveness of chiropractic and medical care have emerged as important issues in the broader debate on evidence-based healthcare.^{10,11}

Chiropractors and health promotion

Chiropractic principles claim to emphasize wellness, prevention and, to a certain degree, health promotion. In addition, chiropractors report providing a substantial portion of prevention and wellness-based care in the U.S.¹²⁻¹⁴ Several studies have investigated whether doctors of chiropractic (DCs) perform HP and most report some health educational activities in practice.^{14,15} However, the question as to whether chiropractic care influences modifiable risk behavior is largely unanswered, especially from the perspective of the patients.

The *Job Analysis of Chiropractic, 2005* reported that the percentage of patients receiving some HP advice ranged from 40% receiving advice on disease prevention to 65% on general physical fitness and exercise.¹³ Interestingly, a study by Jamison in Australia gives some indication as to the type of health information DCs are most comfortable providing from a self-reported, self-efficacy perspective.¹⁶ It should be noted that self-efficacy is simply the feeling one can replicate the behavior desired such as advising adequately in this case. Her study suggests that DCs are very comfortable with giving advice on exercise, for instance, but much less comfortable with advice on other “wellness” topics. While 91% said they felt comfortable giving advice on exercise, only 13% felt comfortable giving advice on alcohol use and only 12% regarding substance abuse.

Recent analyses of the National Health Interview Survey indicated that respondents who reported seeing a DC and not a medical physician (MD) in a period of 12 months were more likely to report “heavy drinking” compared to those seeing only an MD¹⁷ and very few stated that they had been advised by their doctors on diet change and weight loss even when they were overweight or obese. However, when advised by either a MD or DC, a majority reported an attempt at compliance.¹⁸ Previous investigation indicates that U.S. medical and chiropractic curricula are deficient in training their students on advising roles in HP, especially smoking cessation.¹⁹⁻²² HP and health education have been emphasized for years in the field of chiropractic,^{15,22-28} but studies do not indicate a wide adoption of HP activities in the profession.^{17,18,29-31} However, topics covered recently do include areas such as fall prevention,^{32,33} balance,³⁴⁻³⁸ domestic violence prevention^{39,40} and screening for adverse drug events.⁴¹

The need for health promotion practice in chiropractic care

The American Chiropractic Association and the Association of Chiropractic Colleges have position statements that encourage HP and preventive efforts related to wellness.^{42,43} This is important, since so many acute neck and back pain patients consult DCs and because a minority of medical patients report having been counseled on health-related behavioral change.^{44,45} Further, patients who develop chronic spine problems tend to have a higher prevalence of co-morbid health conditions than the general public in aggregate.⁴⁶⁻⁴⁸ In addition to those indications that spinal patients may need more emphasis on general preventive care, numerous agencies, researchers, and accrediting bodies have called for more prevention and HP education emphasis within the practice of health care delivery.^{13,19,46-48} Limiting morbidity and disability from back conditions is also a focus area under Healthy People guidelines.³

According to the Council on Chiropractic Education (CCE):

“Health promotion includes general strategies to enhance quality of life, prevent disease, trauma and illness including ergonomics, psychosocial supports, exercise, diet and nutrition including lifestyle counseling and health screening...”⁴⁹

In January 2006, this new CCE standard for the delivery of HP and wellness went into effect at America’s chiropractic colleges. This included demonstration of the ability to determine how lifestyle, behavior, and other factors affect the wellness of the patient and the demonstration of skills, knowledge, and ability to communicate needs regarding required changes in lifestyle that will be conducive toward better health.⁴⁹

The aim of this report was to review the literature for papers that stressed the use of health promotion, with or without health behavior theories (HBT), and to assess the literature on advising prevention in the chiropractic clinical educational setting. In addition, this report emphasizes the various HBTs and outlines how they may assist in promoting better advising behaviors among clinicians and interns in the clinical education setting.

Methods

The authors searched the literature using PubMed, Google Scholar, ChiroAccess, as well as their personal literature files and reference tracking. Search terms included “chiropractic and health promotion” and “chiropractic and prevention.” The authors restricted the review to papers that included an emphasis on health promotion in the clinical education setting or that used HBT to frame an intervention or educational program.

Results

Only a few studies could be identified within the chiropractic literature documenting HBT-based interventions to improve the practitioner's behavior towards health promotion. However, additional papers emphasized the need to apply HBT in practice ranging from patient communications⁵⁰⁻⁵² to promoting health advocacy⁵³ through use of Ecological Theory (ET),⁵⁴ which posits multi-factorial cause for most health problems including social and environmental constructs.

Notable non-theory publications

In 2003 Hawk and colleagues²⁸ pre and post-tested students' familiarity with and intention to use key HP concepts, resources, and practice techniques following an educational intervention. The goal of their study was to implement and evaluate a model course on "wellness concepts" for chiropractic students that emphasized national goals and evidence-based practices for HP and prevention. The study was conducted at a chiropractic college and employed teaching methods that included traditional lecture discussions and experiential activities, centered on the Healthy People 2010 objectives. The investigators noted significant increases in students' self-reported familiarity on key HP concepts. Although slight increases in intent were noted during the education process, statistically significant differences were rare from pre to post intervention evaluations because a majority of the students had predetermined they would use HP at baseline. This study did not attempt to evaluate the actual practice of HP by the students. The authors suggested that didactic methods of teaching HP be integrated into the clinical education, as well as an emphasis on practical application of HP in chiropractic clinical practice.

Hawk and Evans assessed 9 teaching clinics on smoking cessation advising and intake paperwork related to assessment of patient smoking status.⁵⁵ Although they assessed for provider cues to take action, they did not mention HBT. Gordon and colleagues proposed a pilot program to focus chiropractors on advising on tobacco cessation.⁵⁶ They mention barriers to this process as well as readiness to quit smoking as constructs, but do not specifically cite or mention HBTs.

Killinger proposed HP for older Americans engaged in chiropractic care⁵⁷ and although no HBTs were mentioned, she suggested the need for enabling and reinforcing factors as well as the need for the doctor to "cue" patients to take action; both of which are integral parts of HBTs. Globe and colleagues performed two chart reviews to assess the effect of a model program in public health on advising rates.³⁰⁻³¹ Although they did not report measurable differences, and did not mention specific HBTs, they do mention the need to frame messages toward the positive when recommending behavior changes.

Ndetan and colleagues performed random chart reviews at two teaching clinics after the CCE standard went into effect and found some HP activities but noted a fragmented system of recording them and serious gaps in delivery of HP delivery, often indicating patients at risk receiving no HP advice at all on a given visit.⁵⁸

Terre and colleagues authored a selective review of the empirical literature on family violence.³⁹ This paper discussed integrating the screening and detection of family violence with chiropractic training.

The authors held that there is a clear need to translate the didactics of family violence into the clinical setting but made no attempt to design any interventions in this regard. Mertz and a team of investigators assessed various scoliosis screening programs for their use of planning theories or change theories but found none that relied on either of those.⁵⁹ Borody and Till reported on a new course on HP modeled after an online course on public health at the Canadian Memorial Chiropractic College.⁶⁰ The investigators surveyed students' perceptions and motivation to study and apply course content in clinical settings before and after the implementation of the new online model course. Their report indicated significant improvements in perceived relevance of HP to chiropractic practice and motivation to learn the material as a foundation for clinical practice. In the short term, the students embraced changes made to the content and delivery of the course based on the online course model, but no mention of HBT is noted.

In 2008 Rose and Ayad published a study on the factors associated with changes in knowledge and attitude toward public health concepts among chiropractic college students enrolled in a community health class.⁶¹ Although this was not an interventional study targeting the HP behavior of chiropractic students, it assessed factors associated with an intervention that was already in place. The intervention was a second-year chiropractic college course in community health. The authors noted that the course had a positive impact on students' knowledge of and attitudes towards HP and public health concepts, while also eliminating the eminent disparities in these views across gender, race, age, political inclinations and religious beliefs that existed at baseline (before the course was given). However, the investigators noted a certain degree of stigmatization regarding immunization and recommended that additional educational strategies were needed to ensure changes in future practice behavior, particularly in the area of opposing necessary, routine vaccinations. In 2009 Johnson and Green described how DCs could view public health, wellness and prevention within the context of practice by applying best-practices in the clinical setting.⁶²

Theory-driven chiropractic interventions

The literature related to the application of health behavior theories in improving the chiropractors' or chiropractic interns' behavior regarding HP practice is sparse. **Table 1** lists papers or interventions that have utilized specific HBTs. Evans and colleagues published two papers in 2005 and 2006⁶³⁻⁶⁴ that reported on a theory-based intervention to increase intern and staff advising on smoking cessation at one teaching clinic. In their study, they used methods driven by evidence-based health behavior theories in planning an education campaign (intervention) aimed at improving the behavior of chiropractic interns towards advising their patients on smoking cessation. The overall goal of the study was to move interns from possible lack of awareness related to the need to advise patients, to awareness, agreement with the need to advise, and adopting this as practice, then adhering to smoking cessation counseling as a new behavior. The study was based on Pathman-PRECEDE theoretical framework⁶⁵ which, in turn, was constructed after the Green and Krueter's PRECEDE-PROCEED model.⁶⁶ The model was applied in an educational campaign, with focus on identifying the predisposing, reinforcing, and enabling, factors for the new advising behaviors. In this study, Evans and colleagues identified factors that would aid the facilitation and focused on moving interns toward adoption within the PRECEDE-PROCEED model, which

was also centered on winning the support of key college stakeholders such as the college president, the clinic chief-of-staff, and the director of research. Their interventions led to the change of vision of the college to include a wellness orientation and the college later became a smoke-free campus.

Table 1. HBT Utilized in Chiropractic Education or Research

Author(s)	Aim of Intervention	Theory or Constructs Cited	Outcome
Evans ⁵⁰	Increase awareness of HBTs with DCs	Message-framing, TTM	N/A
Evans ⁵¹	Increase awareness of HBTs with DCs	HBM, TTM, SLT, ET	N/A
Evans ⁵²	Increase awareness of HBTs with DCs	TTM, Cues to action	N/A
Mertz, Thompson, Green, Wyatt, Akagi ⁵⁹	Assess scoliosis interventions for presence of planning or HBTs	PRECEDE-PROCEED, HBM	No use of HBT noted in review
Hawk, Baird ¹⁹	Pilot project on tobacco advising with DC as audience	Advised doctor cue to action(HBM, SLT)	Advising and doctor cue to action feasible
Hawk, Evans ²²	Assess intake paperwork, patient population for advice given on tobacco cessation, information given in 9 teaching clinics	Assessed doctor cue to action (HBM, SLT)	Fragmented system of record keeping, low level of advising, information
Evans, Hawk, Strasser ⁶²	Education campaign to increase advising and information given to patients on smoking cessation	HBM, SLT, ET	Increased advising rates, increased among of information from pre/post
Evans, Hawk, Boyd ⁶³	Education campaign to increase advising and information given to patients on smoking	As above (Describes intervention in	As above

	cessation	more detail)	
Evans, Breshears ⁶⁸	Assessed barriers, knowledge, attitudes toward hand hygiene and table surface sanitizing in teaching clinics	HBM, SLT, ET	N/A
Shearere, Bhandari ⁴⁰	Cross-sectional survey on intimate partner violence	Assessed attitudes, knowledge, beliefs	N/A
Evans, Williams, Perko ⁵³	Increase awareness of advocacy role of DCs	ET	N/A
Evans, Ndetan, Williams ⁷⁰	Cross-sectional survey of future intentions of interns on use of HP in practice	TRA	High level of behavioral intent to use HP in practice
Evans, Ramcharan, Ndetan, et al. ⁷²	Education campaign to increase hand hygiene and table surface sanitizing in 2 teaching clinics	HBM, SLT, ET	Increased observed and reported hand /surface hygiene
Gordon, Istvan, Haas ⁵⁶	Pilot study to increase advising on tobacco by DCs	Doctor cue to action, readiness to change assessed	Patients reported some compliance in pilot
Ndetan, Evans, Lo et al. ⁵⁸	Assessed two teaching clinics for advising on HP by retrospective file review	Assessed intern or staff doctors cues to action	Low levels of cues to action
Leach and Yates ⁷⁴	To have DCs encourage better diet and soccer participation by area youths	SLT	Pilot project-could be effective, nutrition knowledge increased

Key: DC-doctor of chiropractic, ET-Ecological Theory, HBM-Health Belief Model, SLT-Social Learning Theory, TRA-Theory of Reasoned Action, TTM-Trans-theoretical Model or “stages of change”

This study applied two health behavior theories within the PRECEDE-PROCEED planning model, and constructs of Bandura's Social Learning Theory were applied in addressing the self-efficacy of the interns.⁶⁷ The theory's construct of "cue to action" was also emphasized regarding the interns' ability as health care providers to get their patient to quit smoking as was vicarious learning from staff clinicians who were to model the advisory role behavior.

The second theoretical model they considered as essential to their smoking cessation educational campaign project was the Trans-Theoretical Model (TTM), developed by Prochaska and DiClemente.⁶⁸ This model makes reference to 5 stages of susceptibility to health behavior change (stages of change): the pre-contemplation (no idea or intention of changing a behavior); contemplation (actively considering making a change in behavior, perhaps thinking about where to begin); preparation (taking steps to prepare for change); action (taken some action such as date setting, discussing intentions with others, etc); and maintenance (maintaining a new behavior for at least 6 months). The study employed materials and delivery methods developed according to constructs of these health behavior principles. Materials were of two broad classes: instructional materials for interns including an hour Power Point lecture given by the principal investigator; 3" X 5" card guiding interns through engagement of patients using the Surgeon General's 5-A's; a chart stamp for clinic supervising doctors to track smoking cessation advising done by interns and; informational materials for their patients (campaign buttons for the intern's clinic jacket, posters placed in each treatment of report room of the outpatient clinic from the CDC, brochure rack at the clinic check-out desk to provide quick and easy access to brochures for patients and resource directory of cessation programs available in the Dallas/Ft. Worth Metroplex). Key to the campaign were the Surgeon General's 5-A's which instructed the interns to "ask" all patients about smoking status; "advise" all patients to quit smoking; "assess their willingness to make a quit attempt"; "assist" in any patient cessation effort; and "arrange for follow-up" and set a date to check on the patient. This campaign was a one month campaign and pre-post campaign evaluation of interns advising role on smoking cessation increased by 25% as noted in the literature.

Evans and Breshears⁶⁹ tested interns' attitudes toward hand hygiene and table sanitizing using the Health Belief Model (HBM)⁷⁰ to identify barriers to this practice and looked at peer attitudes and knowledge based on ET.⁵⁴ Evans, Ndetan and Williams assessed intentions of chiropractic interns regarding use of HP in practice.⁷¹ They applied the Theory of Reasoned Action (TRA)⁷² assessing the intentions on use of HP in practice and identify attitudes, beliefs, and other influencing factors of graduating interns along with their feelings about how wellness and HP education was being delivered in a chiropractic college. Constructs of the TRA served to frame 20 survey questions that helped determine what factors in the educational experience of the students might influence use of HP in their future practice. TRA explores health behaviors in relation to intentions, beliefs, and attitudes. It suggests that an essential determinant of behavior is an individual's behavioral intention. The theory proposes that behavioral action is determined by intentions with an individual's intention to perform a behavior determined by attitude towards the behavior and normative beliefs.

Evans and a team of researchers at two college campuses pre- and post-tested an education campaign aimed at increasing compliance on hand hygiene and treatment table surface sanitizing utilizing

components of the HBM, ET and SLT. ⁷³ This campaign increased both observed and self-reported compliance levels.

A project by Leach and Yates aimed at clinical education could be applied in the education of DCs or in the field. ⁷⁴ This program applied SLT to develop a model of better nutrition advice and encouragement of physical activity through soccer for combating obesity and overweight in youths. They applied the specific constructs of observational learning, behavioral capability and enhancement of self-efficacy from SLT.

Discussion

The role of theory in planning health interventions

Effective HP and public health intervention programs can have dramatic effects not only on people but on the entire health care system, especially in this era of persistent health care crises (increased mortality/morbidity and burgeoning cost). This can assist patients in maintaining and improving health, reducing disease risks, and managing chronic illnesses which in turn can help reduce health care cost. Such programs have the potential to impact well-being and self-sufficiency at different levels: individuals, families, organizations, and/or communities. ⁷⁵ Many existing programs target the patient population directly but studies that focus on changing the behavior of health care providers appear to be less common. Yet, these are equally important especially since HP has not been fully embraced by US health care delivery system. It is important to note that not all health programs and initiatives achieve the desired outcomes. A clear understanding of targeted health behaviors and the environmental context in which they occur is crucial. Interventions (planning, implementation, and monitoring) that are theory-driven are likely to be more successful compared to those developed without considerations of a theoretical perspective. ⁷⁵

Using theory as a foundation for program planning and development is consistent with the current emphasis on using evidence-based interventions in public health, behavioral medicine, and preventive medicine. Theory presents a systematic way of understanding events or situations and can be applied to a broad variety of situations. Health behavior and health promotion theories (conceptual or theoretical frameworks) draw upon various disciplines, such as psychology, sociology, anthropology, consumer behavior, and marketing. ⁷⁵ This diversity in perspectives gives planners the tools for moving beyond intuition to design and evaluate health behavior/interventions based on understanding of behavior and help them identify the most suitable target audiences, methods for fostering change, and outcomes for evaluation. Theory can also help to explain the dynamics of health behaviors, including processes for changing them, and the influences of the many forces that affect health behaviors, including social and physical environments. Apart from explaining “why,” “what,” and “how” health problems should be addressed, health theories also help identify which indicators should be monitored and measured during program evaluation.

The success and effectiveness of many interventions depend on using theories and strategies that are appropriate to a situation. Because there is a plethora of health explanatory and change theories, deciding how well a theory or model “fits” a particular situation/issue is usually challenging and requires care and deliberation. In addition to working knowledge of specific theories, familiarity with how they have been applied in the past may also be insightful. Investigators or practitioners who use theory develop a nuanced understanding of realistic program outcomes that drives the planning process.

Extent of application of health behavior theory in changing/assessing HP behavior of future chiropractors

Problems, behaviors, populations, cultures, and contexts of public health practice are broad and varied. As such, no single theory dominates health education and promotion. In the education campaign to improve the cigarette cessation advising role (behavior) of chiropractic interns, Evans and colleagues^{63,64} used the PRECEDE-PROCEED model.⁶⁶ PRECEDE-PROCEED is not a model aimed at changing individual behavior but rather a planning model that allows health educators and others design effective communications or health promotion efforts in a community. The design by Evans and colleagues is an eloquent testimony of putting theory and practice together by applying both planning and HBTs. The PRECEDE-PROCEED planning model offers a framework for identifying intervention strategies to address factors that are linked to a specific outcome of interest such as a major health risk in a community. It helps develop an intervention program step by step, integrating perhaps multiple theories to explain and address a health problem. Typical steps would include epidemiological, behavioral, educational, environmental, organizational, administrative and policy diagnoses or assessments. A central feature of a comprehensive planning model such as this is resource acquisition and identification of problem-specific scenarios. This was a big part of the design by Evans et al, as the investigators identified that institutional policies, including stakeholders (college president, research director and clinic chief-of-staff) as well as sources of funding were major challenges and marshaled initial efforts in overcoming these perceived barriers. They combined two behavior change theories for greater impact and use them as bases for evaluation.

Bandura’s Social Learning Theory⁶⁷ was used to develop a set of assumptions that centered on self-efficacy of the interns as well as the premise of cue-to-action. They went on to test and adjust these while adding more assumptions through the application of the TTM. To a larger extent this was a well designed theory-driven intervention and the result did not only elicit positive behavior changes among the interns but also enacted a policy (a smoke free campus). Although the theory was not mentioned by name, they certainly applied some aspects of the HBM⁷⁰ (which also contained the constructs of self-efficacy and the cue-to-action in addition to some constructs on perceived threat and benefits) to their intervention. The overall goal of that project was to move interns from possible lack of awareness to awareness and agreement that they should be advising patients, adopting this as practice, and adhering to smoking cessation counseling as a new behavior. Although TTM which they applied would offer explanations for stages of change it does not guarantee linear changes along a continuum. TTM acknowledges people may experience recidivism. A possible alternative model to this that offers theoretical bases to directly explore and evaluate the stages of change addressed in the study goal is the

Stages of the Precaution Adoption Process Model.⁷⁶ This model specifies seven distinct stages in the journey from lack of awareness (a focus of the intervention) to adoption and/or maintenance of a behavior.

Another avenue to explore that has been considered to have significant impact in changing behavior is motivational interviewing (MI).⁷⁷ This method attempts to get the patient to contemplate the reasoning behind a needed behavior change and to move them toward self-motivated action through guided, empathetic dialogue.

In the theory-driven evaluation of behavioral intention the TRA was reasonably applied as an explanatory theory. It offered explanations on how behavioral intention determines a behavior and how attitudes towards a behavior, subjective norms, and perceived behavioral control influence behavioral intentions. While this model validly explains how the causal web of beliefs, attitudes, and intentions drive behavior there is still a missing piece in the pie: how the presence or lack of enabling, predisposing or reinforcing factors that may make it easier or more difficult to perform the behavior affects perceived behavioral control which can drive behavioral intentions. This missing piece could be addressed by a potential extension of this model to including the Theory of Planned Behavior,⁷⁸ especially as it assumes that factors such as culture and social environment influence certain behaviors (an assumption that is implicit in this study). A planning model such as PRECEDE-PROCEED would also aid in filling in those gaps as well.

Non-medical providers and other CAM providers interact with patients on a more frequent basis than physicians and may be more likely to advise positive behavior changes.⁷⁹ This aspect of patient care should not be underestimated when helping patients move toward reductions in risky health behaviors.

Conclusion

Included in the health care responsibilities of primary contact practitioners is the requirement that they serve as a relevant information source for their patients when it comes to reducing health risks. Chiropractors may effectively achieve disease intervention and prevention by participating in the health education of their patients. Clinicians should teach and model this educating and advising role. In line with chiropractic philosophy, their perspective should be holistic. In order to minimize intrusion upon the practice of their clinical expertise, health education tools are recommended for use by these practitioners with an HP conscience. Chiropractic has traditionally regarded itself a wellness profession. As prevention and a wellness model of care can be postulated to predict the future growth of this profession, the development of a wellness ethos acceptable within conventional health care is desirable. Thus, there is urgent need to prepare future DCs (current interns) for the role of advising prevention. Emphasis should be placed on providing interns with HP techniques, skills, self-efficacy, and motivation in an effort to prepare them for the challenge of interfacing with an increasingly evidence-based health care system.

Chiropractic researchers or program planners may derive benefits from the application of health behavior theories in designing interventions targeting healthy behavior. In applying theories or adopting models that have been successful in other settings the concept of targeting a population based on shared characteristics or risks and tailoring change messages for improved health outcomes should be seriously considered.

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