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## Therapeutic Alliance and Adherence to a Plant-based Eating Plan to Treat Chronic Disease

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## SOCIOLOGY | RESEARCH ARTICLE

# Therapeutic alliance and adherence to a plant-based eating plan to treat chronic disease

Michiel A van Zyl<sup>1</sup> and Lesley M Harris<sup>2\*</sup>

**Abstract:** *Background:* Systematic reviews show that a plant-based diet offers many benefits to patients with a variety of chronic illnesses. However, more research is needed to show how plant-based diets are successfully prescribed by physicians and what supports are essential for adherence. The primary research questions in this study were: Is therapeutic alliance correlated with adherence to the eating plan?; Does a change in therapeutic alliance result in a change in adherence?; and How do patients view the doctor-patient relationship and adherence? *Methods:* This multiple methods feasibility study combined cross-sectional pre-post and six-month follow-up survey, a focus group and case study methodology. *Results:* Patients rated their relationship with their PCP as high, and most patients (78.3%) strictly adhered to the eating plan. Strictness in following the plan was positively correlated with therapeutic alliance ( $r = 0.346, p = 0.025$ ). Both the PCP and the support group members attributed the doctor-patient relationship as central to the change process. Patients also emphasized their ownership of the plan, a supportive community environment and a positive change in health as motivation for adherence. *Conclusion:* Adherence rates, ameliorated by the doctor-patient relationship, indicated that the diet is a feasible option for the treatment of chronic disease.

**Subjects:** Psychological Science; Health and Social Care; Medicine, Dentistry, Nursing & Allied Health

**Keywords:** social support; health care; education; chronic illness

### ABOUT THE AUTHORS

Both Michiel A van Zyl and Lesley M Harris work in the field of HIV/AIDS prevention and treatment focusing on vulnerable groups such as older people and groups associated with risky behaviors. Challenges to adherence to treatment plans pose considerable barriers to optimal treatment, while a nutritious diet is an essential component of any regimen. Nutrition is also important in the management, and increasingly the treatment, of a variety of other chronic diseases. Identifying factors that enhance adherence to a nutritious diet for patients with chronic illnesses is therefore an important area of research.

### PUBLIC INTEREST STATEMENT

A growing body of evidence show that a plant-based diet is beneficial to patients with a variety of chronic illnesses. However, plant-based diets are not routinely prescribed by physicians for patients with chronic diseases and not advocated for in medical circles mainly due to concerns that patients will not follow a plant-based eating plan. One of the factors that may increase adherence to a plant-based diet is the provider-patient relationship. Important findings of this study were that strictness in following the eating plan was positively correlated with the patient-provider relationship, and participants acknowledged that the doctor-patient relationship was central to the change process. Patients also emphasized their ownership of the plan when power was transferred from the provider practice to a local community movement.

## 1. Introduction

Many studies, inclusive of systematic reviews and meta analyses, show that a plant-based diet offers many benefits to patients with a variety of chronic illnesses and may even be considered as a treatment plan for diseases such as high blood pressure, diabetes, cardiovascular disease, and obesity (Barnard, Levin, & Yokoyama, 2015; Dean & Gormsen, 2012; Kontogianni & Panagiotakos, 2014; Turner-McGrievy & Harris, 2014; Yokoyama, Barnard, Levin, & Watanabe, 2014). Research findings emphasize the benefits of a plant-based diet in the management of chronic diseases (Bunner et al., 2015; Tuso, Stoll, & Li, 2015), and physicians have been advised to recommend a plant-based diet to all their patients, as chronic diseases can be prevented, controlled and in some cases reversed by changing how we eat (Esselstyn, 2001; Tuso et al., 2015). However, many remain skeptical as more research is needed to show how plant-based diets are successfully prescribed by physicians and what supports are essential for adherence. Adherence to an eating plan may be more difficult than adherence to a medication regime as it is associated with considerable change in the way people plan daily activities, their friendships and social interactions around meals, their choice of food and shopping habits. One of the supports for adherence is the relationship with the primary care provider (PCP).

The patient-doctor relationship as perceived by the patient is considered to be an important factor in health outcomes. This is particularly true in psychotherapy and the concept of the helping alliance or therapeutic alliance was developed to describe the therapeutic elements of the relationship and how they contribute to positive health outcomes. Aspects of the patient-doctor relationship such as high levels of trust, helpfulness and empathic understanding have commonalities with this psychotherapeutic alliance. Therapeutic alliance overlaps to some extent, but is also different from patient satisfaction. In treatment adherence, therapeutic alliance is preferred to patient satisfaction as a mediator of health outcomes (Porcerelli, Murdoch, Morris, & Fowler, 2014; Van der Feltz-Cornelis, Van Oppen, Van Marwijk, De Beurs, & Van Dyck, 2004).

The importance of patient-practitioner relationship takes on new importance in approaches based on active patient engagement in their own care. This move away from viewing patients of chronic conditions as passive recipients of care is relevant to prescribing a plant-based diet where the treatment model requires active patient engagement in partnership with health professionals. In a systematic review of effectiveness and meaningfulness of the patient-doctor encounter in treatment of chronic conditions Reese and Williams (2009); found that encounters need to be patient-oriented focusing on positive self-care behavioral and health outcomes. Also patients' self-care management involves both social and medical management, and patient participation in the patient-practitioner encounter is a key factor in effectiveness. Education combined with regular review of progress based on diagnoses and treatment goals, were of particular importance. Elements that can effectively support self-care management during a patient-practitioner encounter include information giving, such as the use of a guidebook, the use of care plans, the structure of treatment using checklists, and education and support for staff in collaborating practices or initiatives. Also helpful were endorsements of the patient's view as a reliable and accurate source of information about physiological function and modifying advice in accordance with patient's bodily cues and patients' feedback of their experiences. Organizational factors include time, resources, expectations and structure of a consultation, the opportunity for open access to appointments and to the same provider, and early referral to other professional groups (Reese & Williams, 2009).

On the other hand, the absence of a positive alliance is not only associated with lower adherence to treatment, but also with issues related to monitoring. Ciechanowski, Katon, Russo, and Walker (2001) found that attachment style and communication quality in patient-provider relationship was significantly associated with HbA1c levels. Adherence to medications and glucose monitoring was worse in patients with dismissing attachment and who rated their patient-provider communication as poor. Patients who feel vulnerable due to their illness often feel closer relationship with their provider when the focus is on diagnosis and treatment and a sense that the provider can be trusted as an expert. In a study of breast cancer patients, Beesley, Goodfellow, Holcombe, and Salmon (2016)

concluded that because of their vulnerability, patients invested their trust in the surgeon as the person whom they felt had the authority to help them.

## **2. Research questions**

Given the strong evidence that a healthy plant based diet is effective in the treatment of chronic disease, this study explores adherence and therapeutic alliance as factors in feasibility of the intervention. Esselstyn's (2001) guidelines for an optimum plant based diet were used to define the specific protocol of the plant-based eating plan. The plan encourages lots of vegetables (cooked or raw), fruits, beans, peas, lentils, and certain seeds and is generally low fat. Apart from completely avoiding all animal-based products the avoidance of nuts and added oil is also recommended, particularly if severe coronary artery disease is present. The diet is generally known as the "no added oil plant-based eating plan" or NOP.

The primary research questions in this feasibility study were:

RQ1: Is therapeutic alliance correlated with adherence to the eating plan?

RQ2: Does a change in therapeutic alliance result in a change in adherence?

RQ3: How do patients view the doctor-patient relationship and adherence?

## **3. Research procedures and methodology**

### **3.1. Design**

This multiple methods feasibility study combined cross-sectional pre-post and six-month follow-up survey, focus group and case study methodology. The case study was of the practice of a family medicine physician and includes an in-depth interview with the physician, the focus group was with the leaders and members of a patient-driven support group following the eating plan, and surveys of patients with chronic disease who participated in the support group captured self-reported data on health status and adherence to the eating plan. The study was reviewed by the Institutional Review Board at the University of Louisville.

### **3.2. Survey sample**

All patients who participated in the patient-run support group for the plant-based eating plan were invited to participate in a Web-based survey. The majority, but not all the patients, was from one physician (the one interviewed as part of the study).

### **3.3. Procedure**

The survey included a demographic section and questions on (i) initial diagnosis; (ii) retrospective and current health status, quality of life (iii) adherence to the eating plan; and (iv) therapeutic alliance. The brief six-month follow-up survey included questions on therapeutic alliance, adherence, health status and quality of life. Contextual information on the general practice and approach to patients were obtained in an in-depth interview with the physician. A focus group with leaders and members of the support group provided information on views on adherence and therapeutic alliance from the patient perspective. The qualitative methods included an in-depth interview with the PCP to explore issues and experiences from different perspectives.

### **3.4. Variables and measurement**

The patient survey included questions derived from a number of standardized measures. The Patient-Doctor Relationship Questionnaire (PDRQ-9) is based on the therapeutic alliance literature and derived from the Helping Alliance Questionnaire of Luborsky intended for use in psychotherapy and focus on how well the patient regards his PCP as an effective and helpful health professional in primary care settings (Van der Feltz-Cornelis et al., 2004). The internal consistency of the PDRQ-9 is high (Cronbach's  $\alpha$  of 0.94–0.96), the test-retest reliability acceptable (Pearson  $r = 0.61$ ), and the PDRQ-9 correlated in the hypothesized direction with other constructs such as the DDPRQ- 10

( $r = -0.22$ ,  $p = 0.003$ ), with construct validity also supported by non-significant correlations with patient age, health and psychological distress (Porcerelli et al., 2014; Van der Feltz-Cornelis et al., 2004). The Medical Outcomes Study (MOS) Measures of Patient Adherence of the Rand Organization (Stewart, Hays, & Ware, 1988) was used for adherence. Reliability of the measure is high (Cronbach alpha = 0.81). Three additional questions relevant to this study were asked about adherence. Medication load was assessed by a single item on prescription medication used. Lastly, two questions assessed if cost prevents full adherence to the eating plan. A six-month follow-up survey prompted patients to answer questions on adherence, health status and quality of life.

The qualitative data that we present were taken from 127.6 min of interview data with the PCP and 12 focus group members. Although an interview guide was utilized in the interview and focus group, for the interview to be emergent in nature care was taken to ensure that the unique perspectives of each participant, and important and relevant information from their point of view came to the forefront of each interview. The interview with the PCP included a semi structured interview guide that covered a range of topics, such as conditions of prescribing the eating plan, strategies for patient engagement and adherence and social support (Appendix A). The interview with the focus group covered a range of topics including their engagement with the eating plan and the support group, social support, their relationship with their physician and their environment (Appendix B). Additional questions to both the physician and support group leaders, not specific to the research questions, as well as health status and quality of life measures included in the survey that were beyond the focus of this study, were reported elsewhere (Van Zyl, Harper, & Harris, *in press*).

### 3.5. Data analysis

The survey sample responses were analyzed using general descriptive statistics and multivariate analyses were performed on pre-post changes in therapeutic alliance and adherence measures. Explorative analyses were conducted on changes between post and six-month follow-up changes. The data presented in the qualitative section, represent our findings from the narratives of the PCP and the support group members as they describe their everyday experiences. Constructivist grounded theory (CGT) analysis techniques were employed in order to stay grounded in the participants' beliefs and experiences as they related to the eating plan. Transcripts from interviews were coded by two PhD-level researchers trained in qualitative data analysis using constructivist grounded theory techniques (Charmaz, 2014). Dedoose software was utilized as an analytic tool for coding these data, as well as a mechanism for conducting an interrater reliability test using the other researcher's coded transcripts to ensure that agreement was reached among both coders (Dedoose Version 5.0.11, 2014). The two researchers obtained a pooled Cohen's kappa statistic of 100% or perfect agreement (Cohen, 1960; De Vries, Elliott, Kanouse, & Teleki, 2008; Landis & Koch, 1977). Our approach facilitated the identification of significant patterns and constructs that offered a rich understanding of the patients' and physicians' understandings of therapeutic alliance and adherence to the eating plan. Description and interpretation followed, including development of themes related to internal and external factors that promote or inhibit a patients' ability to adhere to the plan. To ensure the rigor of the analytic process, the qualitative analysts met with other members of the research team frequently to discuss coding and analysis, maintained memos related to all analytic decisions, and engaged in other analytic tools such as discussing and writing about the process of reflexivity throughout the research process (Charmaz, 2014; Corbin & Strauss, 2008; Miles & Huberman, 1994).

## 4. Results

### 4.1. Response rate and demographic description of the sample

The link and invitation to the online survey was distributed to 123 individuals of the patient run support group and 57 (46%) responded by completing all or most of the questions to the survey. Two reminder emails were sent as a follow-up to the initial invitation. Of the 57 participants, 23 or 40.4% also responded to the six-month follow-up survey. A high percentage (42%) reported having a Bachelor's degree, and an additional 21% of respondents had post-graduate degrees followed by

19% with an associate degree. Sixteen percentage reported high school as their highest educational level. Respondents were almost exclusively of Caucasian origin (95%), with only one Hispanic/Latino, one African American, and one “Other” ethnic respondent. Gender was equally represented in the sample with 50.9% males and 49.1% females. The mean age of participants was 65.7 years ( $SD = 9.68$ ) and 75.4% reported being married or living with a partner. The sample was fairly evenly divided between three average household income levels: 32% in the \$40,000–\$75,000 income bracket, 26% earning more than \$100,000 and 25% with an income between \$75,000 and \$100,000. A lower percentage (17%) reported an average household income of below \$40,000.

#### **4.2. Health status**

A more comprehensive description of the pre-post health status of the sample was provided elsewhere (Van Zyl et al., *in press*). The leading chronic diseases included in the self-report of respondents were hyperlipidemia (high cholesterol) (31.6%), 22.8% said they had heart disease, the same percentages (22.8%) diabetes, and arthritis (22.8%). Total of percentages does not add up to 100% as more than one condition could be reported. The mean poor health rate before starting on the no added oil eating plan was 3.01 ( $SD = 1.04$ ) on a 5-point Likert scale with 5 being “poor” and 1 “excellent”. A relatively high percentage (40%) of respondents were on the eating plan for three or more years, 27% for less than a year, 20% for 2–3 years, and 13% for 1–2 years. Four reported being on the no added oil plant-based eating plan for less than three months.

#### **4.3. Health outcomes**

Improved health outcomes were reported by respondents since being on the eating plan across a number of conditions including total cholesterol, body mass, medication load, general health rating, mobility and general feeling. Results of health outcomes are reported in more detail elsewhere (Van Zyl et al., *in press*).

#### **4.4. RQ1: Is therapeutic alliance correlated with adherence to the eating plan?**

##### **4.4.1. Therapeutic alliance**

The Patient-Doctor Relationship Questionnaire (PDRQ-9) focused on how well the patient regards his PCP as an effective and helpful health professional in primary care settings. Most of the patients included in the survey were from the same practice of the primary care provider at the time the survey was conducted. The mean PDRQ-9 during the time of the survey was 39.7 ( $SD = 6.36$ ) out of a maximum score of 45.

##### **4.4.2. Adherence**

Overall the adherence to the NOP was high as reflected by the 78.3% of respondents who endorsed a 4 or a 5 on a 5-point Likert scale to the question “Overall how strictly do you follow the no added oil plant (NOP) based eating plan?” with 5 being very strictly. A high percentage (71%) of the sample who answered this question with a 4 or 5 were on the eating plan for six-months or longer. An even higher percentage (84.1%) responded by a 4 or a 5 to the question “In the last two months how strictly did you follow the NOP based eating plan?” Of those who responded with a 4 or 5 on this question, 72.2% were on the eating plan for six-months or longer. The mean adherence score on the Patient Adherence Scale of the Medical Outcomes Study (MOS) of the Rand Organization was 5.27 on the 6-point scale. By far most respondents (79.1%) did not find it too expensive to follow the NOP, while 18.6% found it too expensive a little of the time and one respondent said the NOP was too expensive most of the time.

##### **4.4.3. Correlations**

Overall strictness in following the plan was positively correlated with therapeutic alliance ( $r = 0.346$ ,  $p = 0.025$ ). Responses to the question “Overall how strictly do you follow the no added oil plant (NOP) based eating plan?” was positively correlated with a question about poor health before following the plan (1 = excellent health and 5 = poor health) ( $r = 0.37$ ,  $p = 0.012$ ) and also with the difference in

overall health ratings before and after following the plan ( $r = 0.40$ ,  $p = 0.006$ ), but there was no significant correlation between this question and the health rating after following the plan ( $r = 0.036$ ,  $p = 0.814$ ).

#### **4.5. RQ2: Does a change in therapeutic alliance result in a change in adherence?**

Soon after the initial survey the physician moved to a different state and the PCP's patients had to find a new provider. This change provided an ideal opportunity to further explore therapeutic alliance and adherence. The mean PDRQ-9 during the time of the survey was 39.7 ( $SD = 6.36$ ) out of a maximum score of 45, but the six-month follow-up mean score for patient-doctor relationship decreased to 34.72 ( $SD = 9.19$ ) after the forced change in PCP. This change was significant  $t(18) = -2.27$ ,  $p = 0.037$ . However, the patients who participated in the follow-up survey did not report any change in their strictness of adherence to the NOP eating plan in comparison to their adherence six months earlier ("Overall how strictly do you follow the no added oil plant (NOP) based eating plan?"  $t(20) = 0.000$ ,  $p = 0.000$ ; "In the last two months how strictly did you follow the NOP based eating plan?"  $t(19) = 1.143$ ,  $p = 0.267$ ). Their mean scores on the Medical Outcomes Study (MOS) Measures of Patient Adherence that focused on difficulty to follow instructions of their PCP, were higher during follow-up, although this difference was not significant (Follow-up  $M = 12.37$ ,  $SD = 5.12$ , Survey  $M = 10$ ,  $SD = 4.29$ )  $t(18) = -1.72$ ,  $p = 0.103$ .

#### **4.6. RQ3: How do patients and the PCP view the doctor-patient relationship and adherence?**

##### *4.6.1. Adherence to plan*

Both the physician and the patients described the challenges and successes in adhering to the eating plan. Some common challenges for the physician were: patients saying that they are adherent when they are not, patients becoming a vegan and not an oil free vegan, patients with cognitive decline, those who may not be able to read or with limited internet access may find it more difficult, and patients stay on it for a relatively long period and then stop being on the plan.

I found that there are a lot of people who do really well for six months or a year and then they kind of slide off and then they get sick and then they have to decide on getting back again. So it's a moving target. So it's not like ok this person is compliant we don't have to worry about them.

There were also patients who follow the plan with little encouragement or follow-up.

So and then you know I have patients who I see for physicals who want to be healthy and I don't see them for a year and then they come back and tell me that they have been eating this way for a year (or) so. It's just ... and they haven't come to any of our meetings so it's just kind of natural.

Both the PCP and the support group members describe adhering to the plan as being "successfully" engaged in their health care. They outline strategies and tactics that they used to stay adherent.

##### *4.6.2. Strategies to help with adherence*

The plan enabled patients to reduce medication, which was described by both the PCP and the patients as being a motivation to change/continue on the plan. In addition, the PCP used the tactic of discussing medication load reduction as a way of initially engaging with patients around conversations about the eating plan.

A strategy used by the PCP to engage patients in their care and adhere to the plan was to include their family members in the plan:



I gave them a movie a Netflix movie to watch it is called Forks Over Knives and the reason why I think that is helpful is because it gives the spouses a topic to look at something together.

This is not an individual treatment here. If someone sought this treatment the whole family is affected. The spouse if affected ... and so you know you don't really address that you are only treating one person of course when you have a visit but really you are affecting a whole family.

Patient's remarks corroborated the helpfulness of reading material and watching a video as a strategy to commit to the eating plan and stay adherent.

So it took me about 3 or 4 months before I finally got and read the book or parts of the book and saw Forks Over Knives or something like that. Anyhow once I saw what it was about I decided to commit myself to it. January 31st 19 ... 2013 I started ...

Patients found advocating for healthier options on menus at restaurants helpful to them to be adherent. Most helpful to adherence for patients was making a mind shift to where they saw being on the eating plan as a new way of living. Once that shift took place, they did not conceptualize the plan as a "diet" anymore, particularly because there was no need to control calorie intake.

Once you have crossed this threshold where it is no longer a diet that I do but it is how I live my life.

It is basically empowerment by getting life skills back.

You know we eat what we want we are not really on a diet.

But it is really good because you can cram this much food in you and then you stop and you eat two hours later you know for doctors to really you know if they are having a patient that you know has some overeating issues that would be really good to you know to recommend this lifestyle because you know they can eat and eat and eat and be healthy.

#### 4.6.3. *Therapeutic alliance*

Both the PCP and the support group members spoke about the relationship between the patient and the physician being a central to the change process. Through the process of the patients and physician engaging with each other, and relating to each other over a shared investment in the eating plan created an environment which made change possible for the patient.

According to the PCP the therapeutic alliance played a significant role in patients' adherence to the eating plan and their willingness to take this on, as well as their willingness to be involved in support groups. The PCP acknowledged that people in his profession have a significant amount of influence over patients due to the power dynamics of the medical field. When asked about the dynamic, the PCP replied,

Yes I think it is very important the trust relationship between the physician and patient so I think that is a big part in why a lot of my patients have actually looked at it.

The PCP went on to describe how this alliance extends beyond medication adherence or simple engagement in care:

So you know I think eating is such a personal thing and you know it's not like prescribing a pill which is easy to do it takes so many parts of your life; it's not just eating foods you like but it's actually the way you relate to people and there are certainly facets that affect that.

Support group members reflected on their relationship with their PCP and how this relationship engaged them in the eating plan:

So anyway that is how I kind of came around to it and why I am doing that for myself but it really helps and we have physicians who are supporting the patients and it is the best situation. It is just really cool because that's what our patients want. That's what we all want is for physicians to be able to guide us in another way.

Exactly we have a lot of respect for our doctors and what they say so and what they mean you know when you are talking about a condition that is life or death and your doctor is saying no that is not going work that is not enough protein you really are going to take that to heart.

#### 4.6.4. *Moving beyond therapeutic alliance*

Both the PCP and the support group members credit this program as being successful and feasible due to the relationships that they formed with their doctor and support group members. All of the participants described this program as a local community movement which involved not only support, but politics and activism, which required a collective approach to organizing the network of patients. The PCP spoke about removing the power of the plan from his practice, and giving it to his patients:

So I am a strong proponent of this being a grass roots program not a medical doctor person program and something that if I was the one in charge I need lots of you know an army out there encouraging people and helping me so that is what I did. I did discover a few folks that were very strong proponents of it and found the benefits for their lives and then encouraged them to start support groups and they did just that.

## 5. Discussion

Patients included in the survey rated their relationship with their PCP as high, a mean of almost 40 out of a maximum of 45. By far most patients (78.3%) strictly adhered in general to the eating plan and 84.1% did so strictly in the two months before taking the survey. Over 70% of these patients were on the plan for 6 months or longer. On a 6-point scale the mean rating of patient' adherence was 5.27, a score indicating a high level of adherence. This was particularly true for those who experienced poor health before going on the plan ( $r = 0.37$ ,  $p = 0.012$ ) and patients who experienced a more dramatic difference in overall health ratings before and after following the plan ( $r = 0.40$ ,  $p = 0.006$ ). In general, these patients did not find it too expensive to buy fresh fruit and vegetables, but cost may be a factor in lower income patient populations. Strictness in following the plan was positively and significantly correlated with therapeutic alliance ( $r = 0.346$ ,  $p = 0.025$ ).

Both the PCP and the support group members acknowledged the importance of the doctor-patient relationship as central to the change process of going on a plant-based eating plan and staying on the plan. Although the PCP and the support group members attribute successful adherence to the relationships that they formed, at least initially, they also see success in the longer term as depending on more than the therapeutic alliance. In the end, patients must own the plan and when power is transferred from the PCP practice to a local community movement which involved not only support, but community organizing and advocacy, an environment for adherence is successfully created over the longer term. This move beyond relying on the doctor-patient relationship is supported by the finding that although the mean score for patient-doctor relationship decreased significantly to 34.72 ( $SD = 9.19$ ,  $t(18) = -2.27$ ,  $p = 0.037$ ) after the forced change in PCP, patients did not report any change in their strictness of adherence to the NOP eating plan in comparison to their adherence six months earlier.

In general, the findings of this study were supportive of what Reese and Williams (2009) found in their systematic review. The focus on positive self-care behavioral and health outcomes and recognition that self-care management involves both social and medical components were found to

be important in both studies. Reese and Williams (2009) identified elements to effectively support self-care management inclusive of information giving, such as the use of a guidebook, the use of care plans, the structure of treatment using checklists, and education and support for staff in collaborating practices or initiatives. In this study the PCP also made use of additional reading material and watching a video, there was a focus on monitoring and outcomes. Furthermore, education and collaboration with partners in the wider community was elevated by the support group to a level of advocacy. Similar to the previous finding that endorsements of the patient's view as a reliable and accurate source of information was important, the PCP emphasized a relationship of trust between the provider and patients, but also identified a lack of truthful feedback from the patient, when reports do not align with test results and other bio indicators, as a challenge to adherence.

The promise of a cost-effective, low-risk intervention for many chronic conditions that, for example, lowers body mass index, blood pressure, HbA<sub>1c</sub>, cholesterol levels, and chronic osteoarthritis offers new hope to many patients with chronic conditions. The finding that a considerable change in health status from poor to much improved, is associated with higher rates of adherence, means that the eating plan is potentially even more beneficial for those with severe conditions. A focus on medication load reduction, involving family members, and engagement with the support group, contributed in the view of respondents to adherence. Challenges for adherence for the physician include patients saying that they are adherent when they are not, and patients becoming a vegan and not an oil free vegan, as well as patients who do not read or have access to the internet. The PCP found it difficult to predict who will be adherent to the plan and who will not, and was surprised by some patients who were strictly adherent for six months or longer and then stop following the treatment plan, while others will follow the plan with almost no or minimum encouragement.

Although the study included a cross-sectional pre-post and six-month follow-up survey, focus group and case study, there are limitations. The case study was of only one PCP, the focus group was of members of one support group, the sample size was relatively small and the survey did not include a control group. Despite these limitations the study offered a multi-faceted view of adherence to a treatment plan that demanded life style changes over the longer term.

## 6. Conclusion

Therapeutic alliance correlated significantly with strictness in adherence to the no added oil plant-based eating plan and both the PCP and patient-run support group members attributed successful adherence to the provider-patient relationships that they formed. However, their view of long term adherence shifted from this relationship to active patient involvement in managing their health and a transfer of power from the PCP practice to a local community movement. This finding underscores the importance of provider-patient relationship for adherence during the initial phase of change before a habit of adherence has been developed. Also the transfer from provider-relationship reinforcement of adherence to reinforces that occur in the natural environment of patients, is significant for sustainability of the desired behavior. Group members' views of adherence included different strategies to facilitate adherence and both the PCP and patients reported on the extent of change across life domains necessary to make adherence successful. Adherence rates, ameliorated by the doctor-patient relationship, indicate that the NOP is feasible option for the treatment of chronic disease.

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## Appendix A

### Primary care physician questions.

#### Plant-based eating plan study.

- (1) For what conditions do you prescribe the eating plan?
- (2) Do you describe the eating plan to all patients with those conditions?
- (3) How do you “sell” the idea of the eating plan to patients?
- (4) What is your perception of the adherence rate to the eating plan?
- (5) Are there some patient characteristics that predict adherence to the plan?
- (6) What patient outcomes do you monitor and how often?
- (7) What evidence do you have that this approach works?
- (8) In general, what is your view of a support/action group to help with adherence?
- (9) How involved are you with the support group?
- (10) How feasible do you think it is to replicate your approach in other family medicine practices?

## Appendix B

Focus group questions.

Plant-based eating plan study.

- (1) I would like to start by asking each of you how you came to engage in a plant-based/no added oil eating plan?
- (2) How did you become engaged in the support group?
- (3) Next we would like to know more about the administration of the group. How do you run it, what does it take to do this?
- (4) How do you teach others how to adhere to the plant-based eating plan?
- (5) Next we would like to talk to you about social support.
  - (a) Can you tell us about what kind of support you have received from your family about the eating plan?
    - (i) What were their initial reactions?
  - (b) Can you tell us about what kind of support you received from your friends?
  - (c) Can you tell us about what kind of support you received from this group?
  - (d) Can you tell us about what kind of support you have received from an online community.
- (6) Next we would like to know more about your relationship with your primary care physician and other physicians.
  - (a) How important is to be connected to a physician that you trust and believe in?
- (7) When interviewing the primary care physician for this study, we learned about the important role of nutritional educator at Whole Foods. Can you tell us what your interactions have been like with her? What did you learn?
- (8) How feasible do you think this practice and this support group is in other places (states, cities, or environments)?
- (9) What are the key ingredients that have made this support group and community work in Louisville?
- (10) What lessons have you learned about running a support group such as this?
- (11) What would you like others to know about the importance of a plant-based/oil free eating plan?



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