The diagnostic and clinical management of individuals recommended gluten free diets by complementary medicine practitioners

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ABSTRACT

Objectives: Excluding gluten containing foods from the diet is medically indicated for the management of coeliac disease, wheat allergy, gluten ataxia, non-coeliac gluten sensitivity, and dermatitis herpetiformis. However, the number of people following a gluten free diet (GF diet) far exceeds the number of people with an indication for such dietary restriction. It has been suggested that 70% of individuals who are recommended GF diets by complementary medicine practitioners have not had coeliac disease adequately excluded. The aim of this study was to describe the diagnostic and clinical management practices of naturopaths, Western herbalists and nutritionists (non-dietetic) associated with recommending GF diets.

Design, subjects and outcome measures: A cross-sectional 40-item questionnaire was developed and administered online to 145 Australian naturopaths, nutritionists (non-dietetic) or Western herbal medicine practitioners via professional associations and a practice based network (PRACI) between February and April 2017. Demographic data and practice information related to recommending GF diets was collected.

Results: A total of 56.5% (82/145) practitioners reported that in the majority of cases they did not undertake any recommended diagnostic process, and 48% (71/145) of practitioners referred to a general practitioner to exclude medical conditions related to gluten ingestion prior to recommending a GF diet. A total of 10% (15/145) ordered coeliac serology through local laboratories, and 17% (24/145) through functional pathology companies. Non-coeliac gluten sensitivity was diagnosed by 56% (82/145) through an elimination and reintroduction diet, and 61% (88/145) used a diet and symptom diary. IgG antibody tests were used by 23% (33/145) of practitioners, and 5% (7/145) used kinesiology prior to recommending a GF diet.

Conclusion: Clinical guidelines for the diagnosis of gluten related disorders are not followed by a substantial number of complementary medicine practitioners prior to recommending a GF diet. Strategies are required to improve the standard of practice in this area.

1. Introduction

A gluten free diet is a necessary treatment strategy for people who are medically diagnosed with coeliac disease (CD), wheat allergy, gluten ataxia, non-coeliac gluten sensitivity (NCGS) [1], and dermatitis herpetiformis [2]. The most prevalent of these is CD, which involves an autoimmune response triggered by the ingestion of dietary gluten in a genetically predisposed population [3]. It is estimated that 1% of the worldwide population have a CD diagnosis [3]. NCGS is a disorder that exhibits similar symptoms to CD with the absence of biological markers of disease [4]. People with NCGS have symptom relief following removal of dietary gluten. The prevalence of NCGS is currently unknown; however, is estimated at between 0.6 to 6% [5]. In addition, there are media reports that suggest as much as 20% of the population may follow a gluten free diet [6]. The high prevalence rate, suggests there are perceived health benefits and expectations

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that extend beyond those known for the medical management of CD and NCGS.

The diagnosis of most gluten-related disorders relies on specific biological markers. CD is diagnosed through specific and sensitive serological and histological investigations. There are currently no established biological markers for the diagnosis of NCGS, which is primarily diagnosed through dietary challenge after a diagnosis of CD and WA have been eliminated [5]. It has been reported in the literature that NCGS and the adoption of a gluten free diet is primarily via self-diagnosis or prescribed by a complementary medicine (CM) practitioner [6]. CM practitioners have also been identified as a significant influence on individuals who exclude wheat from the diet [7].

Diagnostic guidelines are available to primary health care practitioners for the diagnosis of gluten related disorders; however, little is currently known about how CM practitioners diagnose and manage gluten related disorders in their practice [3]. One Australian study of adults (n = 147) who reported having NCGS found that only 28% met the diagnostic criteria for NCGS, and CD was inadequately excluded in 70% of the gluten-free diets initiated by CM practitioners [6]. As little is known about the diagnostic and clinical management behaviours of CM practitioners recommending GF diets, the aim of this study is to investigate the diagnostic and clinical management practices undertaken by naturopaths, Western Herbalists and nutritionists (non-dietetic) prior to recommending a gluten free diet.

2. Materials and methods

2.1. Study design

A sub-group analysis within a cross-sectional survey of Australian naturopaths, nutritionists (non-dietetic) and Western herbal medicine practitioners. The initial survey was sent to the PRACI database which consisted of 215 naturopaths, nutritionists and western herbal medicine practitioners throughout Australia. The response rate from the PRACI database was 35.8% (77/215). The survey was then distributed through two associations, NHAA and ANTA. These association have approximately 2000 members. Therefore, the response rate from these association was approximately 3.4% (68/2000). Combined, the estimated response rate is 39.2%.

2.2. Ethics

The study was approved by The Human Research Ethics Committee of the University of Sydney (HREC-approval number 2017/139), and the Practitioner Research And Collaboration Initiative (PRACI) steering committee (PRACI approval number 20170110).

2.3. Participants

The sample consisted of CM practitioners including naturopaths, Western herbalists and nutritionists (non-dietetic) who were registered with the practice based research network the PRACI [8], and/or a professional association representing Australian naturopaths, Western herbal medicine practitioners, and/or nutritionists.

2.4. Measures

The survey captured baseline information about the characteristics of CM practitioners; specifically, naturopaths, nutritionists (non-dietetic), and Western herbalists. The survey's 40 items were divided into five sections: practice behaviours, diagnostic and clinical management, inter professional communication, education/training, knowledge of gluten related disorders, and sociodemographic characteristics. The questions were developed by two of the research team (JH and CR) and reviewed by the remaining members (EM, JS and CV) and revised accordingly. The survey was then piloted to the authors naturopathic, nutritionist and/or western herbal medicine practitioner colleagues to check for any comprehension issues or defective questions. This resulted in further refinements and the survey instrument used in this study.

2.5. Recruitment and data collection

Recruitment was conducted via the PRACI network administration service with the approval from the PRACI steering committee. A second stage of recruitment was conducted via the administration service of two professional associations representing complementary medicine practitioners, the Naturopaths and Herbalists Association of Australia (NHAA) and the Australian Natural Therapist Association (ANTA). An email inviting practitioners to participate was sent by the respective organisations. The email contained a link to the survey questionnaire that was administered online between February and August 2017 through SurveyGizmo. Data were collected anonymously.

2.6. Data analysis

Data were imported to Stata14® statistical analysis software. Binary variables were created for all survey items related to diagnosis and clinical management. Descriptive analyses (frequencies and percentages) were conducted for age, gender, personally living with a CD diagnosis, location, qualifications, years since highest qualification, and years as a CM practitioner. Chi-square analysis was conducted to determine the relationship between age, qualifications, and years since practicing as a CM practitioner for survey items relating to diagnosis and clinical management. Chi-square analysis was also conducted to test associations between practitioners who personally follow a gluten free diet and diagnostic processes followed. Cramer's V was used to determine the effect size of the associations for the chi-square analyses [9]. One way ANOVA was conducted to test for differences between qualifications and years in practice with diagnostic processes and duration of therapy.

3. Results

3.1. Demographic and practice characteristics of practitioners

The majority of practitioners were female (92.4%), and middle-aged, with 33.8% between 40 and 49 years old, and 29% between 50 and 59. The least represented age group was between 70 and 79 (2.7%), and 20 to 29 (7.6%). Most practitioners had a clinic in either Victoria (30.5%) or New South Wales (29.8%), with the lowest number of practitioners found in the Northern Territory (0.7%) and the Australian Capital Territory (0.7%). The majority of participants had a Bachelor degree qualification (64.8%) as their highest qualification, and obtained their qualification less than 5 years ago (36.5%). Only 10.3% of practitioners had 15 to 19 years of experience in clinical practice, which compared to 57.2% who had spent 5 to 9 years in clinical practice. Table 1 summarises the descriptive statistics of practitioner characteristics.

3.2. Diagnostic procedures used prior to recommending a gluten free diet

The most frequently used diagnostic procedures prior to recommending a gluten free diet were requesting a diet and symptom diary (68.2%), followed by conducting an elimination and reintroduction of

Table 1
Descriptive statistics reporting demographic and practice characteristics.

Total n = 145					
Gender	**n**	**%**	**Qualification**	**n**	**%**
Male	11	7.6%	Certificate IV	2	1.4
Female	134	92.4%	Diploma	6	4.1
State/Territory			Advanced diploma	24	16.5
NSW	43	29.8	Bachelor Degree	94	64.8
Victoria	44	30.5	Graduate certificate	3	2.1
Qld	38	26.4	Graduate diploma	7	4.8
SA	3	2.1	Masters Degree	6	4.1
WA	11	7.6	Doctor of Philosophy	3	2.1
NT	1	0.7	**Years since highest Qualification**		
ACT	1	0.7	Less than 5 years	53	36.5
Tasmania	3	2.1	5–9 years	31	21.9
Age range			10–14 years	28	19.3
20–29	11	7.6	15–19 years	12	8.3
30–39	26	17.9	**Years in clinical practice**		
40–49	49	33.8	Less than 5 years	50	34.5
50–59	42	29	5–9 years	33	57.2
60–69	13	9	10–14 years	25	17.2
70–79	4	2.7	15–19 years	15	10.3
80+	0	0	20 or more years	22	15.2

gluten diet (62%). The least frequently used diagnostic procedure (5.5%) was the use of unvalidated testing equipment (e.g. Vaga machine). See Table 2 for a summary of the diagnostic procedures used prior to recommending a gluten free diet.

No statistical difference was found between those practitioners who prescribed gluten free diets and age or number of years in practice (Table 3). For level of qualification a moderate statistically significant association was found; those who prescribed a diet and symptom diary had a higher level of qualification (p = 0.044, Cramer's V = 0.315). No association was found for the type of information provided by a CM practitioner and age, qualification, or years in practice (see Table 4).

Table 5 reports the results of the chi-square analysis testing the association between practitioner's personal adherence to a gluten free diet and diagnostic processes. There was a week statistically significant association found between not conducting any testing before prescribing a gluten free diet and practitioner's personal gluten free dietary behaviour; p = 044, Cramer's V = .166. A higher number of practitioners who followed a gluten free diet did not do any testing compared to those who did not personally follow a gluten free diet. Similarly, a relatively strong statistically significant association was found for those who considered clinical presentation as a predictor for needing a gluten free diet and personal adherence to a gluten free diet (p < 0.001, Cramer's V = 0.40); those who followed a gluten free diet were more likely to rely on clinical presentation as a predictor for prescribing a gluten free diet.

3.3. Duration of therapy

A total of 95% (n = 138) of practitioners reported reviewing their patients progress within 8 weeks of commencing a gluten free diet. A total of 3% of practitioners reported advising their patients that a gluten free diet should be followed indefinitely. No significant difference in qualification (F = 0.93, p = 0.4883) or years of practice (F = 1.44, p = 0.2253) were identified between recommendations.

Table 2
Frequencies and percentages for diagnostic procedures used prior to recommending a GF diet.[a]

Diagnostic process taken prior to recommending a GF diet (n = 145)	Count	Percent
Refer the patient to their doctor to test for coeliac disease	76	52.4%
Order standard coeliac pathology testing through a local laboratory	14	9.6%
Order standard coeliac pathology testing through a functional pathology company	24	16.5%
Order IgG antibody testing (gluten) through a functional pathology company	37	25.5%
Use kinesiology to identify the need for a gluten free diet	9	6.2%
Conduct an elimination and reintroduction diet of gluten to diagnose gluten sensitivity	90	62.0%
In the majority of cases I do not conduct any testing prior to implementing a gluten free diet	26	18.0%
In the majority of cases I simply consider the patients clinical presentation as a predictor for needing a gluten free diet	60	41.3%
Request a diet and symptom diary to help identify any association with gluten ingestion and the persons symptoms	99	68.2%
Use diagnostic testing in my practice e.g. Vega machine for identifying the need for a gluten free diet	8	5.5%
Other	10	7.0%

[a] Participants may choose more than one process.

Table 3
Chi-square analysis for associations between diagnostic practices and age, years in practice, and level of qualification.

			Age		Years in Practice		Level of Qualification	
	Yes they do (n (%))	No they don't (%)	Chi Sq P=	Cramers' V	Chi Sq p=	Cramers' V	Chi Sq p=	Cramers' V
Refer the patient to their doctor to test for coeliac disease	71 (48.9%)	74 (51%)	0.059	0.271	0.057	0.251	0.221	0.255
Order standard coeliac pathology testing through a local laboratory	15 (10.3%)	130 (89.6%)	0.344	0.197	0.665	0.128	0.319	0.237
Order standard coeliac pathology testing through a functional pathology company	24 (16.5%)	121 (83.5%)	0.293	0.205	0.363	0.172	0.057	0.307
Order IgG antibody testing (gluten) through a functional pathology company	33 (22.7%)	112 (77.2%)	0.505	0.175	0.378	0.17	0.67	0.184
Use kinesiology to identify the need for a gluten free diet	7 (4.8%)	138 (95%)	0.815	0.124	0.915	0.081	0.481	0.212
Conduct an elimination and reintroduction diet of gluten to diagnose gluten sensitivity	82 (56.5%)	63 (43.5%)	0.187	0.227	0.851	0.096	0.859	0.15
In the majority of cases I do not conduct any testing prior to implementing a gluten free diet	23 (15.8%)	122 (84%)	0.291	0.206	0.137	0.219	0.692	0.18
In the majority of cases I simply consider the patients clinical presentation as a predictor for needing a gluten free diet	59 (40.7%)	86 (59.3%)	0.21	0.221	0.354	0.174	0.122	0.28
Request a diet and symptom diary to help identify any association with gluten ingestion and the persons symptoms	89 (61.4%)	56 (38.6%)	0.194	0.225	0.4	0.167	0.044	0.315
Use diagnostic testing in my practice e.g. Vega machine for identifying the need for a gluten free diet	7 (4.8%)	138 (95.2%)	0.497	0.173	0.736	0.117	0.088	0.292
Other	15	130	0.694	0.144	0.471	0.156	0.574	0.198

Table 4
Chi-square analysis for associations between patient recommendations and age, years in practice, and level of qualification.

	Yes they Do (n (%))	No they Don't n (%)	Age		Years in CM practice		Level of Qualification	
			Chi Sq	Cramers' V	Chi Sq	Cramers' V	Chi Sq	Cramers' V
Verbal counselling about how to follow a gluten free diet	78 (53.8%)	67 (46.2%)	0.525	0.169	0.91	0.082	0.575	0.198
Information sheets detailing how to follow a gluten free diet	75 (51.7%)	70 (48.3%)	0.448	0.18	0.619	0.135	0.096	0.289
Direct the patient to resources such as information internet sites	49 (33.8%)	96 (66.2%)	0.493	0.174	0.767	0.112	0.471	0.213
A combination of all the above	112 (77.2%)	33 (22.7%)	0.114	0.247	0.427	0.163	0.488	0.21
I do not provide any of the above information	1 (0.7%)	144 (99.3%)	0.853	0.116	0.491	0.153	0.999	0.061

Table 5
Chi-square analysis for associations between practitioner dietary practices and age, years in practice, and level of qualification.

	Do follow a GF Diet (n (%))	Don't follow a GF diet (n (%))	Chi Sq p=	Cramers' V
Refer the patient to their doctor to test for coeliac disease	32 (43.8%)	39 (54%%)	0.213	0.1
Order standard coeliac pathology testing through a local laboratory	8 (11%)	7 (9.7%)	0.8	−0.02
Order standard coeliac pathology testing through a functional pathology company	13 (17.8%)	11 (15.3%)	0.682	−0.03
Order IgG antibody testing (gluten) through a functional pathology company	17 (23.3%)	16 (22.2%)	0.878	−0.012
Use kinesiology to identify the need for a gluten free diet	5 (6.8%)	2 (2.8%)	0.253	−0.095
Conduct an elimination and reintroduction diet of gluten to diagnose gluten sensitivity	39 (53.4%)	43 (59.7%)	0.444	0.063
In the majority of cases I do not conduct any testing prior to implementing a gluten free diet	16 (21.9%)	7 (9.7%)	0.044	−0.166
In the majority of cases I simply consider the patients clinical presentation as a predictor for needing a gluten free diet	44 (60.3%)	15 (20.8%)	0.000	−0.401
Request a diet and symptom diary to help identify any association with gluten ingestion and the persons symptoms	42 (57.5%)	47 (65.3%)	0.338	0.079
Use diagnostic testing in my practice e.g. Vega machine for identifying the need for a gluten free diet	2 (2.7%)	5 (6.9%)	0.238	0.098
Other	10 (13.7%)	5 (6.9%)	0.182	−0.11

Table 6
Practitioners estimate of the percentage of people receiving a positive outcome from following a gluten free diet.

Practitioners estimate of number of patients benefiting form a GF diet n = (%)	
0 − 10%	2 (2.9%)
11 − 20%	8 (5.5%)
21 − 40%	10 (14.5%)
41 − 60%	34 (23.4%)
61 − 80%	52 (35.8%)
81 − 100%	37 (25.5%)

3.4. Practitioner's estimate of patients receiving a benefit from following a gluten free diet

As shown in Table 6, approximately one third (35.8%) of practitioners estimated that 61–80% of their patients received a benefit following the implementation of a gluten free diet, with a quarter (25.5%) estimating benefits were received by 81–100% of their patients. A further 23.4% of practitioners reported their patients received a benefit 41–60% of time following implementation of a gluten free diet.

3.5. Complementary medicines prescribed with a gluten free diet

As presented in Table 7, a total of 76% of CM practitioners also prescribed nutraceuticals and herbal medicines in conjunction with a gluten free diet. The most common CMs prescribed by the CAM practitioners for CD included probiotics (62%), glutamine (47%), zinc (43.5%) and prebiotics (43%). For NCGS, probiotics again were the most commonly prescribed adjuvant CM (59.3%), with prebiotics (41.4%) and digestive enzymes (40%) the other most commonly prescribed CMs.

The most common CMs prescribed for all conditions as an adjunct to a gluten free diet include probiotics (average 44%), individualised herbs (average 35.7%), zinc (average 29%,) and fish oils (average 27%). The least common CM's prescribed included psyllium husks (average 5.8%), St Mary's thistle (average 8.9%) and glutamine (average 20%).

No association was found between adjunctive CM supplementation for CD with qualification; (see Table 8); however, fish oils were found to have a statistically significant moderate association with years in practice (p = 0.019, Cramer's V = 0.285). It was found that more CM practitioners who have been in practice less than 10 years prescribed fish oils in conjunction with gluten free diets for people who have been diagnosed with CD. No associations for either qualification or years in practice were found for adjunctive CM supplementation for NCGS (see Table 9).

3.6. Inter professional communication between complementary medicine practitioners and medical doctors

A total of 76% participants reported sharing the care of people with medically diagnosed CD with other health care professionals including general practitioners (92%), gastroenterologists (58%), and dieticians (26.3%). A total of 55% (n = 80) of practitioners communicated with their patient's medical doctor about their treatment suggestions in a variety of ways including: providing a letter to the patient (56%), posting a letter directly to the doctor (17%), sending an email (21%), or making a phone call (4%). The communication was reported as being well received by doctors by 9% of participants, with 9% being poorly received, 35% reasonably received, and 46% receiving no response to their communication at all.

No statistical significance was found between those who communicated with the patient's medical doctor and years in practice or qualifications. Practitioners who held a bachelor degree or higher had the highest percentage of no communication back

Table 7
Frequencies and percentages for type of medical condition prescribed a gluten free diet and adjunctive complementary medicine prescription.

Condition	Prescribed complementary medicine (Total N = 145) n (%)									
	Fish Oils	Digestive Enzymes	Probiotics	Prebiotics	Zinc	Glutamine	Turmeric	Psyllium	St Mary's Thistle	Individualised Herbs
Coeliac disease	31 (21.4%)	58 (40%)	90 (62%)	62 (42.8%)	63 (43.5%)	68 (46.9%)	47 (32.4%)	6 (4.1%)	11 (7.6%)	39 (26.9%)
NCGS	26 (17.9%)	58 (40%)	86 (59.3%)	60 (41.4%)	47 (32.4%)	50 (34.5%)	34 (23.5%)	5 (3.5%)	16 (11%)	43 (29.6%)
IBS	24 (16.5%)	52 (35.8%)	90 (62%)	58 (40%)	47 (32.4%)	48 (33.1%)	37 (25.5%)	19 (13.1%)	13 (8.9%)	53 (36.5%)
IBD	54 (37.2%)	42 (29%)	84 (58%)	48 (33%)	57 (39.3%)	59 (40.7%)	68 (47%)	6 (4%)	12 (8.3%)	49 (33.8%)
Gastric or duodenal ulcers	22 (15.2%)	28 (19.3%)	48 (33%)	29 (20%)	55 (37.9%)	41 (28.3%)	38 (26.2%)	5 (3.5%)	6 (4%)	56 (38.6%)
GORD	13 (9%)	49 (33.8%)	49 (33.8%)	33 (22.8%)	38 (26.2%)	35 (24.1%)	29 (20%)	5 (3.5%)	8 (5.5%)	52 (35.9%)
Functional Dyspepsia	14 (9.7%)	59 (40.7%)	55 (38%)	35 (24%)	34 (23.5%)	22 (15%)	17 (11.7%)	4 (3%)	8 (5.5%)	52 (35.9%)
Chronic constipation	26 (18%)	49 (34%)	81 (56%)	58 (40%)	26 (18%)	23 (15.8%)	15 (10.3%)	41 (28.3%)	30 (20.7%)	41.4%)
Chronic diarrohea	9 (6.2%)	27 (18.6%)	84 (58%)	48 (33%)	35 (24%)	31 (21.4%)	20 (14.8%)	13 (9%)	9 (6.2%)	46 (31.7%)
GIT cancers	29 (20%)	29 (20%)	52 (35.8%)	30 (20.7%)	29 (20%)	26 (18%)	35 (24%)	4 (2.8%)	12 (8.3%)	43 (29.7%)
Mental or neurological conditions	73 (50.3%)	23 (15.9%)	66 (45.5%)	36 (24.8%)	53 (36.5%)	28 (19.3%)	40 (27.6%)	2 (1.4%)	11 (7.6%)	58 (40%)
Infertility	57 (39.3%)	14 (9.7%)	43 (29.7%)	28 (19.3%)	55 (37.9%)	13 (9%)	18 (12.4%)	2 (1.4%)	19 (13.1%)	62 (42.8%)
Reproductive disorders	51 (35.2%)	14 (9.7%)	36 (24.8%)	23 (15.9%)	44 (30.3%)	10 (6.9%)	25 (17.3%)	2 (1.4%)	18 (12.4%)	62 (42.8%)
Developmental disorders	70 (48.3%)	18 (12.4%)	60 (41.4%)	34 (23.5%)	51 (35.2%)	20 (13.8%)	11 (7.6%)	2 (1.2%)	5 (3.5%)	49 (33.8%)
CVD	70 (48.3%)	8 (5.5%)	30 (20.7%)	17 (11.7%)	26 (18%)	8 (5.5%)	35 (24%)	6 (4%)	8 (5.5%)	56 (38.6%)
Weight management	35 (24%)	40 (27.6%)	62 (42.8%)	40 (27.6%)	26 (17.9%)	15 (10.3%)	25 (17.2%)	14 (9.7%)	21 (14.5%)	50 (34.5%)
General wellbeing	61 (42%)	23 (15.9%)	65 (44.8%)	35 (24%)	32 (22%)	10 (6.9%)	23 (15.9%)	7 (4.8%)	12 (8.3%)	49 (33.8%)
Number	665	591	1081	674	718	507	517	143	219	860
Average (percentage)	39.12 (26.9%)	34.76 (24%)	63.59 (43.9%)	39.65 (27.3%)	42.24 (29.1%)	29.82 (20%)	30.41 (21%)	8.41 (5.8%)	12.88 (8.9%)	50.59 (35.7%)

Table 8
Chi-square analysis for associations between CM prescription for coeliac disease and years in practice, and level of qualification.

Supplements	Do prescribe it	Don't prescribe it	Qualification		Years In Practice	
			Chi Sq p=	Cramers' V	Chi Sq p=	Cramers' V
Fish Oils	31 (21.4%)	114 (78.6)	0.825	0.157	0.019	0.285
Digestive Enzymes	58 (40%)	87 (60%)	0.605	0.194	0.166	0.211
Probiotics	90 (62%)	55 (38%)	0.384	0.227	0.889	0.088
Prebiotics	62 (42.7%)	83 (57.3%)	0.473	0.213	0.597	0.138
Zinc	63 (43.4%)	82 (56.6%)	0.170	0.267	0.152	0.215
Glutamine	68 (46.9%)	77 (53%)	0.802	0.162	0.452	0.159
Turmeric	47 (32.4%)	98 (67.6%)	0.830	0.156	0.295	0.184
Psyllium	6 (4.1%)	139 (95.9%)	0.387	0.226	0.302	0.183
St Mary's Thistle	11 (7.6%)	134 (92.4%)	0.860	0.150	0.863	0.094
Individualised herbs	39 (26.9%)	106 (73.1%)	0.203	0.259	0.258	0.191

Table 9
Chi-square analysis for associations between CM prescription for non-coeliac gluten sensitivity and years in practice, and level of qualification.

Supplements	Do prescribe it	Don't prescribe it	Qualification		Years in Practice	
			Chi Sq p=	Cramers' V	Chi Sq p=	Cramers' V
Fish Oils	26 (17.9%)	119 (82.1%)	0.819	0.158	0.218	0.222
Digestive Enzymes	58 (40%)	87 (60%)	0.563	0.200	0.068	0.245
Probiotics	59 (59.3%)	59 (40.7%)	0.647	0.188	0.568	0.142
Prebiotics	60 (41.4%)	85 (58.6%)	0.250	0.249	0.965	0.063
Zinc	47 (32.4%)	98 (67.6%)	0.280	0.244	0.564	0.143
Glutamine	50 (34.5%)	95 (65.5%)	0.391	0.225	0.839	0.099
Turmeric	34 (23.5%)	111 (76.5%)	0.537	0.204	0.360	0.173
Psyllium	5 (3.5%)	140 (96.5%)	0.785	0.165	0.724	0.119
St Mary's Thistle	16 (11%)	129 (89%)	0.839	0.154	0.300	0.183
Individualised herbs	43 (29.37%)	102 (70.3%)	0.651	0.187	0.904	0.084

from medical practitioners (87%), while those who have been in practice less than 10 years had the highest percentage of no communication back (54%).

The reported reasons for not communicating to a patient's doctors included: not feeling confident about communicating with doctors (13%), doctors had been dismissive in response to previous communication (37%), the patient didn't want the CM practitioner to communicate to their doctor (21%), or they didn't think of it (3%). The main reasons provided by 95% of participants who reported recommending their patients seek their doctor or medical specialist's advice included failure for their condition to respond to a gluten free diet 59%, and/or the health condition changed to a more serious nature (75.5%).

4. Discussion

Our findings indicate that the majority of CM practitioners represented in this study, support the premise that there are

additional health benefits outside of those with an established medical indication for following a GFD.

Importantly, these findings suggest that the diagnostic and clinical management processes adopted by CM practitioners are diverse, and a substantial proportion of practitioners do not undertake steps towards excluding CD or other gluten related disorders prior to recommending a gluten free diet for the majority of patients. These findings are supported by previous reports that CD is not adequately excluded in 70% of the gluten free diets initiated by CM practitioners [6]. There are a number of possible reasons that may explain such practice behaviours. These practices may be associated with a lack of understanding about the importance of excluding CD in the interest of individuals immediate and long term medical management [10]. Alternatively, CM practitioners may be assuming that exclusion of gluten from the diet would adequately provide the current standard treatment for CD. However, it is well established that a formal medical diagnosis of CD is required to direct appropriate medical follow up and care [10], and removes any ambiguity about the necessity for a strict gluten free diet, and provides solid evidence for its indication [11].

A more generic recommendation of a gluten free diet for a broad number of symptoms and conditions without appropriate exclusion of CD, indicates practitioners may not be aware of the extra-intestinal presentations and symptoms of CD [12]. Reasons to suspect a person may be living with CD are outlined by The National Institute for Health and Clinical Excellence [13] guidelines, which recommend that serological testing for CD should be offered to people with any of the following: persistent, unexplained abdominal or gastrointestinal symptoms, children with faltering growth, severe or persistent mouth ulcers, unexplained iron, vitamin B12 or folate deficiency, type 1 diabetes, autoimmune thyroid disease, irritable bowel syndrome, or having a first degree relative with coeliac disease. In addition, CM practitioners may not know about the increased prevalence of CD in other conditions [14]. The NICE guidelines recommend considering serological testing for individuals with conditions known to have a greater prevalence of CD; including those living with metabolic bone disorders, unexplained neurological symptoms, unexplained sub-fertility or recurrent miscarriage, persistently raised liver enzymes with unknown cause, dental enamel defects, Down syndrome, and Turner syndrome.

There are significant complications for the health and quality of life of people with undiagnosed or poorly managed CD [10]. It is important that all health care practitioners contribute to reducing the significant number of undiagnosed cases of CD. CM practitioners may not be aware that an estimated four out of five people with CD in Australia remain undiagnosed [15], and that population screening has been shown to identify three times more people with CD than detection by clinical suspicion alone [16]. Despite this, population screening is not conducted in Australia, but health care practitioners are well placed to identify less obvious cases of CD. The estimated prevalence of CD in Australia has recently increased to 1.2% of adult males and 1.9% of adult females [16].

The finding that practitioners educated <10 years ago were more likely to refer than those who were educated >10 years ago may be an indicator of better education and training on this topic in curriculum over the last decade. The overall low rate of referral for medical assessment across the full cohort may be associated with CM practitioners being hesitant to approach medical doctors with requests for testing. This is a valid concern that may have been fuelled by recent publicity discouraging medical doctors from responding to requests from naturopaths for unnecessary tests [17]. The lack of response from medical doctors to CM practitioners who attempt to communicate about patient care is likely to be an additional barrier for CM practitioners in referring for appropriate testing. A potential solution to this barrier adopted by some CM practitioners is to order tests directly. However, there are limitations to this approach including patient incurred costs that would normally be covered by the Australian Medicare system had the test been ordered by a medical doctor. In addition, in the event of positive serological findings for CD the patient requires referral to a gastroenterologist and possibly other specialists. Such case management is outside the scope of CM practitioners practice.

Our study also found that CM practitioners prescribed a variety of different CM treatments as adjuncts to a gluten free diet depending on other presenting health problems, such as irritable bowel syndrome, mental or neurological disorders, and cardiovascular disease. It is usual practice for CM practitioners in Australia to prescribe nutritional and herbal medicines in addition to dietary modification. Many of the treatments prescribed had either evidence of efficacy or traditional evidence of effectiveness for the conditions they were prescribed for; however, this was not the case for all treatments prescribed. Evidence supporting CM treatment options for various conditions is still an emerging area. Further research is required to identify the treatment options CM practitioners choose for certain conditions that have poor or no evidence to confirm safety and efficacy.

4.1. Limitations and further research

This study has made a significant contribution to understanding the clinical management of the prescription of gluten free diets by Australian CM practitioners; however, there are limitations that need to be addressed. First, there may be sampling bias, as this was a convenience sample of practitioners from two professional associations and a practice-based research network that may not be more broadly representative of these professions.

In addition, there may be differences in the clinical management of gluten free diets between each type of CM practitioner (i.e., Western herbalists, naturopaths, and nutritionists). Future research could consider recruiting larger samples from a broader range of sources, and identifying differences in diagnostic management related to gluten free diets between each type of CM practitioner.

The last limitation was the estimated response rate. From the PRACI database, a response rate of 35.8% (77 out of 215) was achieved. The response rate from the associations, was approximately 3.4% (68 out of 2000).The responses from this survey is only a small representation of the CM practitioners in Australia hence the results from this survey is limited to those who have responded and may not necessarily represent all CM practitioners views.

5. Conclusion

Collectively, given CD prevalence data, poor diagnostic rates and the access to comprehensive diagnostic guidelines it is concerning that approximately 50% of CM practitioners included in this study did not take appropriate diagnostic steps for excluding CD prior to recommending a GF diet. We hypothesise that a number of barriers exist for CM practitioners in adopting a 'stepwise' approach to excluding CD prior to recommending a GF diet. These barriers may include inadequate knowledge about the presentation of CD, inadequate knowledge about the diagnostic guidelines and importance of excluding CD and gluten related disorders, and poor communication with medical doctors to ensure appropriate testing. These findings have significant implications for undergraduate and postgraduate education and professional development for the clinical management of gluten related disorders.

Conflict of interest

There are no conflicts of interest to report.

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