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DERVLA KELLY, Jacqueline Chawke, Megan Keane, Helen Conway, Pauline Douglas, ANNE GRIFFIN

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An exploration of the self-perceived nutrition competencies of pharmacists

Dervla Kelly^{a,b,*}, Jacqueline Chawke^c, Megan Keane^c, Helen Conway^c,
Pauline Douglas^d, Anne Griffin^{b,c}^a School of Medicine, University of Limerick, Ireland^b Health Research Institute, University of Limerick, Ireland^c School of Allied Health, Faculty of Education and Health Sciences, University of Limerick, Limerick, Ireland^d Nutrition Innovation Centre for Food and Health, Ulster University, Coleraine BT52 1SA, UK

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ABSTRACT

Background: Pharmacists are integral members of healthcare teams, providing accessible nutrition care to patients, carers and health professionals. However, little is known about nutrition competence among pharmacists.**Objective:** The aim of the study is to determine the self-perceived competence in providing nutrition care among pharmacists in Ireland.**Methods:** This cross-sectional study used a mixed methods design consisting of an online survey delivered to pharmacists in Ireland. The pharmacists' self-perceived competencies according to confidence in knowledge, skills, communication and counselling, and attitudes in nutrition care were assessed using the validated NUTCOMP questionnaire. Qualitative responses in relation to nutrition knowledge were also gathered. Questionnaire responses were analysed using descriptive statistics and free text narratives were coded into themes and subthemes.**Results:** A total of $n = 557$ (74% ($n = 413$) female; 24.1% ($n = 134$) male) respondents completed the questionnaire providing a 14.9% response rate. Confidence in nutrition knowledge (mean score (SD) 21.6 (± 4.31) out of a maximum of 35 points), nutrition skills (mean score (SD) 31.8 (± 7.74) out of a maximum count of 55) and nutrition related counselling and communication (mean score (SD) 29.8 (± 6.35) out of a maximum of 45 points) were limited. Most respondents had completed a programme with some nutrition content (60.8%) either formally or informally. Previous nutrition education was positively associated with greater scores in knowledge, skills, communication/counselling and attitudes towards nutrition care ($p = \leq 0.001$). Over three-quarters of respondents (78.1%) agreed that they would like further nutrition education to support themselves in their roles as pharmacists. Thematic analysis highlights the role of interprofessional nutrition care, barriers to providing nutritional care in practice and opportunities for improving nutrition training.**Conclusions:** Most pharmacists reported being somewhat confident in their nutrition knowledge, skills and attitudes and are willing to participate in further nutrition education to support their patients. The findings suggest that there are other barriers to providing nutrition care in the pharmacy setting such as time, remuneration and lack of community dietitians.

1. Introduction

Community pharmacists provide accessible healthcare including nutrition advice to local communities. Nutrition care refers to any practice conducted by a health professional to support a patient to improve their dietary behaviours.¹ Pharmacists provide nutrition care to patients, carers and other health professionals including the supply and management of oral, parenteral and enteral nutritional products,² vitamins and minerals, and providing advice on drug-nutrient interactions³ and disease specific support (e.g. renal, hepatic, gastrointestinal).⁴ They also provide public health services such as advice on healthy eating, cholesterol and diabetes consultations.^{5,6}

Calls to action exist in countries such as Ireland, United Kingdom and United States calling for enhanced nutrition education for pharmacy students and professionals.⁷⁻⁹ For example, nutrition care is a key component of best practice guidelines for effective prevention and management of lifestyle-related chronic disease.¹⁰⁻¹² The Accreditation Council for Pharmacy Education (ACPE) and the American Association of Colleges of Pharmacy (AACCP) have recommended increasing the teaching of health promotion and disease prevention in pharmacy.¹³ However, previous studies with pharmacists have reported concerns regarding lack of nutrition knowledge and confidence.¹⁴⁻¹⁶ A systematic review carried out by Waddington et al. found global community pharmacists' therapeutic

* Corresponding author at: School of Medicine, University of Limerick, Ireland.
E-mail address: dervla.m.kelly@ul.ie (D. Kelly).

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knowledge of dietary supplements to be poor.⁴ This is concerning given the widespread use of nutrition and dietary supplements that are both prescribed and available “over the counter” and the associated health risks of misuse.¹⁷ Similarly, knowledge of medical nutrition therapy and complementary/alternative nutrient interactions with medicines was limited among community pharmacists.^{18,19} A recent study carried out by Douglas et al. in Northern Ireland reported self-assessed inadequate knowledge among community pharmacists to deliver nutrition education. Yet, there was promising attitudinal scores towards nutrition.¹⁴

Approaches to improve pharmacists' nutrition knowledge include undergraduate curriculum and lifelong learning initiatives. Nutrition education provided to undergraduate pharmacy students was found to enhance their knowledge of evidenced based nutrition care and ability to identify diet-disease relationships.^{20,21} However, the amount of nutrition education provided by schools of pharmacy varies widely and there is an overall perception that nutrition training is inadequate.^{22–25} Increasing nutrition information available to pharmacists in practice through access to up to date nutrition information, continuing education courses, collaboration with local dietitians or access to advanced support resources for specialist roles have been suggested.^{26,27} Current nutrition practice resources in pharmacy are very specific to the advanced practices involved with enteral and parenteral nutrition with gaps in training in health and promotion and disease management and interprofessional approaches to nutrition care.⁹

The aim of this study was to evaluate registered pharmacists' confidence in the provision of nutrition care. This study also explored the impact of previous nutrition education on competencies in nutrition care. In addition, we sought the pharmacists' views on barriers and opportunities to incorporate nutrition into their everyday practice.

2. Methods

2.1. Study design

This cross-sectional study took a mixed methods approach consisting of an online survey among registered pharmacists on the Pharmaceutical Society of Ireland (PSI) database. The Qualtrics survey software system was the research tool used which collected anonymised responses. The NUTRITION COMPETENCE (NUTCOMP) survey was adapted with permission to assess the self-perceived nutrition competencies of pharmacists in an Irish context.¹ The NUTCOMP is structured questionnaire that has been previously validated to assess the nutrition confidence of primary health professionals using a scored model in nutrition knowledge, skills, communication, counselling and attitudes. The questionnaire items consisted of both quantitative and qualitative questions including Likert scales, closed and open questions and free text narratives (Supplementary Table 1). It included 47 subdivided questions within each of the main five sections (1. Confidence in knowledge about nutrition and chronic disease; 2. Confidence in nutrition skills; 3. Confidence in communication and counselling about nutrition; 4. Attitudes towards nutrition care; 5. Previous nutrition education and training). Adaptations included referencing the Irish Healthy Eating Guidelines and food pyramid.²⁸ Section one to three comprised questionnaire items as a five-point Likert scale rated from 1 to 5 based on the selection from “not confident at all” (1 point), “not very confident”, “somewhat confident”, “very confident” to “extremely confident” (5 points). Section four focused on attitudes towards nutrition care and was constructed similarly using a five-point Likert scale but answers were based on agreement of statements from “completely disagree” (1 point) “somewhat disagree” “neither agree nor disagree” “somewhat agree” to “completely agree” (5 points).

Section five facilitated both quantitative and qualitative information using closed ended and open-ended questions. Demographic characteristics included personal (age, gender) and employment (community/hospital/other, city/small town/rural village/other) information.

Previous nutrition education, whether further nutrition education would be beneficial and the number of years practising as a pharmacist

were recorded. Respondents were given the opportunity to state where they would find out about registered dietitians available in their area and to whom would they refer patients for nutrition advice. A free text box was provided where opinions in relation to nutrition knowledge requirements of pharmacists could be added. Other adaptations included referencing the Irish Healthy Eating Guidelines and food pyramid.²⁸

2.2. Recruitment

In July 2020, the survey was disseminated via email invitation to all pharmacists registered with the PSI ($n = 3729$) to participate in the survey (Supplementary Fig. 1). A reminder email was distributed after 11 days of initial distribution to encourage additional responses. The questionnaire was open for three weeks in total.

2.3. Ethical approval

Ethical approval was obtained from the Education and Health Sciences Research Ethics Committee at the University of Limerick (ref: 2020_03_07_EHS).

2.4. Statistical analysis

The anonymised questionnaire responses were exported from Qualtrics to Microsoft Excel for review. Incomplete surveys ($n = 302$) were removed from analysis. A spreadsheet was created with fully completed answers which were coded and imported to IBM SPSS Statistics 26 for further analysis. Descriptive statistics were performed to determine the demographic information of respondents. Knowledge, skills, attitudes, communication, and counselling scores were calculated by adding up the total scores from each construct answer. The mean and standard deviation scores (\pm SD) were calculated. The data were tested for normality via skewness and kurtosis where z-values were not within range. To comply with the assumptions that underpin Chi-square tests, it was ensured that <20% of cells were below the minimum counts. Where assumptions were violated, Fisher's exact test was used. Nutrition education levels were determined based on three categories; no nutrition education; some nutrition education and predominate focus on nutrition (Supplementary Table 2). Similarly, competency scores were collapsed into three groups rating confidence: low, medium, and high. Chi-square test of independence determined the relationship between respondents' previous nutrition education and confidence in knowledge, skills, counselling, communication, and attitudes towards nutrition care. A p -value of <0.05 was considered statistically significant. The data on programmes reported in the results refers to aggregated data about pre-registration and continuous professional development courses, that is it refers to certificate and non-degree nutrition courses as well as degree programmes that had some nutrition content. Qualitative data in the free text narratives were read and coded into themes and subthemes. These were discussed and agreed by the research team.

3. Results

A total of five hundred and fifty-seven participants ($n = 557$) completed the online questionnaire, providing a 14.9% response rate (Fig. 1). More females than males participated in the survey (74% of females ($n = 413$) vs 24.1% ($n = 134$) of males).

The characteristics of the participants are shown in Table 1. The most common age range was between 35 and 44 years (40%), followed by 45–54 years (24.4%), 25–34 years (21.0%), 55–64 years (11.5%), 65 years or older (2.2%) and 24 years or younger (0.9%). Approximately half of respondents reported to work in a small town (47.4%), followed by a city (34.5%), rural village (12.7%) and other (5.4%). The mean years practising as a registered pharmacist was 18 years (± 10.1). Specific pharmacist roles comprised supervising community pharmacists (49.2%) and community support pharmacists (38.4%). Only 3.2% of respondents

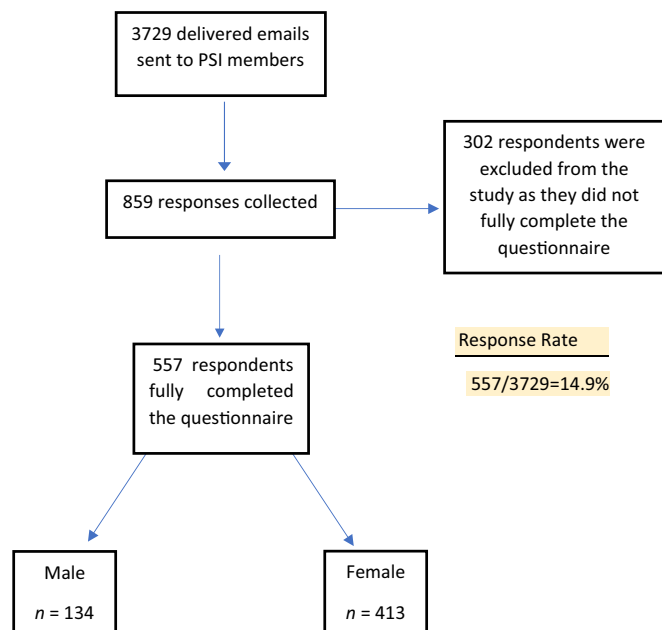


Fig. 1. Flow chart of data collection process.

were hospital-based pharmacists and 9.2% were based in other roles. With regards to previous nutrition education, 60.8% completed a programme with some nutrition content, followed by a programme with no nutrition content (33.0%) and a programme predominately focused on nutrition (6.1%) (Table 1).

Knowledge. The mean score for confidence in knowledge about nutrition and chronic disease was 21.6 (± 4.31) out of a maximum of 35 points (Supplementary Table 3). The majority of respondents reported “somewhat confident or very confident” as the most commonly chosen answers for confidence in knowledge about nutrition and chronic disease. The question of greatest reported confidence was that of how food and nutrients interact with medication (5.9%). On the other hand, “not confident at all or not very confident” was the most frequent answer for the question relating to confidence in knowledge about the most recently published peer-reviewed evidence regarding nutrition and chronic disease (65.5%). Previous nutrition education was positively associated with all questions in the knowledge section ($p < .005$), apart from the Irish food pyramid and healthy eating guidelines where there was no statistical significance between level of confidence and previous nutrition education ($p = .169$).

Skills. The mean score for confidence in nutrition skills was 31.8 (± 7.74) out of a maximum count of 55 points (Supplementary Table 4). The area of greatest reported confidence was the ability to interpret an individual's biological data such as blood pressure and cholesterol values against reference ranges (16.9%). “Somewhat confident or very confident” were most frequently chosen for all questions with the exception of confidence in the ability to: formulate a meal plan for an individual with chronic disease, maintain clear and concise records regarding nutrition-related assessment and access the most recently published peer reviewed evidence regarding nutrition and chronic disease (61%, 58.9% and 58.2% respectively). These were scored highest for “not confident at all or not very confident”. Previous nutrition education was positively associated with having more confidence in all nutrition skills ($p < .05$) except interpretation of an individual's biological data against reference ranges ($p = .288$).

Communication and Counselling. The mean score for confidence in communication and counselling about nutrition was 29.8 (± 6.35) out of a maximum of 45 points (Supplementary Table 5). “Somewhat confident or very confident” were most frequently chosen for all nine questions in this section. Maintaining a non-judgemental attitude in discussions with patients and clients about the food they eat was reported as highest for “extremely confident” (15.3%). Confidence in communication and counselling about

Table 1
Characteristics of respondents.

Characteristics	% (n)
Number of participants	n = 557
Gender	
Male	24.1 (134)
Female	74.1 (413)
Other	0.2 (1)
Prefer not to say	1.6 (9)
Age range	
24 years or younger	0.9 (5)
25–34 years	21.0 (117)
35–44 years	40.0 (223)
45–54 years	24.4 (136)
55–64 years	11.5 (64)
65 years or older	2.2 (12)
Location of pharmacy	
City	34.5 (192)
Small town	47.4 (264)
Rural village	12.7 (71)
Other	5.4 (30)
Years practicing as a pharmacist	
Mean (± S·D)	18 (± 10.1)
Type of pharmacist	
Hospital pharmacist	3.2 (18)
Community pharmacist: support pharmacist	38.4 (214)
Community pharmacist: supervising pharmacist	49.2 (274)
Pharmacist other: specified as:	
<i>Locum</i>	39.2 (20)
<i>Part time</i>	5.9 (3)
<i>Academic</i>	3.9 (2)
<i>Industry</i>	5.9 (3)
<i>Management</i>	9.7 (5)
<i>Legal</i>	2.0 (1)
<i>GP practice</i>	2.0 (1)
<i>Combination of roles</i>	15.6 (8)
<i>Medicines information</i>	3.9 (2)
<i>Community pharmacist owner</i>	5.9 (3)
<i>Clinical setting</i>	2.0 (1)
<i>HSE pharmacist</i>	2.0 (1)
<i>Risk management</i>	2.0 (1)
Which best describes previous nutrition education	
I have completed a programme that did not include any nutrition content	33.0 (184)
I have completed a programme that included some nutrition content	60.8 (339)
I have completed a programme that was predominately focused on nutrition	6.1 (34)

Values are % (n) unless otherwise stated. SD, Standard Deviation.

nutrition was positively associated with previous nutrition education in the following questions: clearly describe what patients/clients can expect from discussions with you about food and nutrition ($p < .001$), check a patient's/client's understanding of the influence of food and nutrients on their health ($p < .001$), work with patients/clients to identify possible ways to improve the food they eat ($p < .001$), identify individuals who need additional support from other health professionals or services regarding the food they eat ($p < .001$) and communicate with other health professionals about the discussions you've had with patients/clients regarding food ($p = .001$).

Attitudes. The mean score of attitudes towards nutrition care was 35.1 (± 4.29) out of a maximum of 40 points (Supplementary Table 6). There was agreement of “somewhat or completely agree” towards nutrition care in relation to the importance of adequate nutrition and facilitating nutrition care during professional practice. ‘Providing specific nutrition recommendations to patients/clients that can assist with managing their chronic disease is within my scope of practice’ was somewhat lower at 69.8%. Previous nutrition education was least likely to be positively associated with attitudes towards nutrition care among pharmacists as compared to the previous three domains. However, it was still positively associated with the agreement that encouraging patients/clients to eat healthy foods is an effective use of their professional time ($p = .22$), providing specific nutrition recommendations to patients/clients that can assist with managing their chronic disease is an effective use of their professional time

Table 2
Relationship between self-perceived nutrition competencies and previous nutrition education.

Score counts		Programme with no nutrition education	Programme with some nutrition education	Programme predominately focused on nutrition education	p-value (Exact Sig 2- sided)
		n	n	n	
Knowledge	Low (9.0–18.0)	75	55	3	p < .001
	Medium (18.1–27.0)	98	254	22	
	High (27.1–35.0)	11	30	9	
Skills	Low (13.0–26.0)	64	68	3	p < .001
	Medium (26.1–39.0)	105	207	19	
	High (39.1–55.0)	15	64	12	
Counselling	Low (9.0–21.0)	26	19	0	p < .001
	Medium (21.1–33.0)	124	217	15	
	High (33.1–55.0)	34	103	19	
Attitudes	Low (16.0–20.0)	2	1	0	p = .001§
	Medium (20.1–30.0)	39	31	3	
	High (30.1–40.0)	143	307	31	

Statistical significance value of $p < .05$. Values compared using Chi-square unless otherwise indicated. § Fishers exact test for this test when Chi-square assumptions were violated.

($p = .040$), encouraging patients/clients to eat healthy foods is within their scope of practice ($p = .002$) and providing specific nutrition recommendations to clients that can assist with managing their chronic disease is within their scope of practice ($p = .001$).

Nutrition competency scores were categorized into low, medium and high to determine associations with previous nutrition education (Table 2). Because the overall scores were varied from construct to construct based on the number of questions in each section, the categories were grouped differently. There was a statistical significance between score counts in knowledge, skills, attitudes and counselling and communication with previous nutrition education ($p \leq .001$).

No statistical significance was observed between nutritional knowledge scores and gender ($p = .491$) or area of practice ($p = .382$). Nor, was there a statistical association between score counts in skills, communication and attitudes with gender ($p = .913$; $p = .769$; $p = .153$) or area of practice ($p = .441$; $p = .417$; $p = .836$), respectively.

Relating to the knowledge of local community nutrition services, a total of 51.7% ($n = 288$) of participants reported that they refer patients or clients for nutrition advice whereas 31.6% ($n = 176$) reported not referring people for nutrition advice. The most popular profession chosen for nutritional referrals were made to dietitians (58.7%, $n = 169$), followed by general practitioners (27.1%, $n = 78$), nutritionists/nutritional therapists (11.8%, $n = 34$), diabetes services (8%, $n = 23$), nurses (6.9%, $n = 20$), unspecified answers (6.3%, $n = 18$) and weight management services (1.4%, $n = 4$). Forty-seven percent of respondents reported to know where to refer to registered dietitians in their area while 50.8% ($n = 283$) did not know registered dieticians in their area.

Approximately half of the respondents (52.6%, $n = 293$) agreed that further nutrition education to support their roles as pharmacists would be useful. This was followed by strongly agree (25.5%), neither agree nor disagree (12.9%), strongly disagree (5.9%) and disagree (3.1%). The desire for further nutrition education was not associated with level of previous nutrition education ($p = .631$).

Three main themes were identified from the free text comments: i) Challenges to nutrition care, ii) Nutrition care practice development, and iii) Interprofessional collaboration. For each theme, the subthemes are described below and in Table 3.

3.1. Interprofessional collaboration

Pharmacists were comfortable in the role of “signposting” clients to people who could provide appropriate nutrition care. Participants frequently identified dietitians as experts in providing nutrition care. Some identified the lack of a clear dietitian referral pathway currently in the community, although others did describe referring patients to their local dietitian or

general practitioner. Many pharmacists are happy to follow advice from dietitians and “reinforce dietitians’ messages”.

“Would love to work more closely with local dietitians to be able to easily refer patients but no direct contact between two professions”.

The lack of dietitians in Irish primary care teams was a concern for some participants.

“There is a major lack of community-based dietitians both in the HSE and private. This is much needed in the primary care setting”.

3.2. Challenges to nutrition care

Challenges to providing nutritional care in practice were identified as time constraints because nutritional consultations are time consuming and usually secondary to ongoing medication dispensing and counselling, which is already demanding.

“It’s hard to find the time to learn it and spend time with patients discussing it.”

While pharmacists acknowledged the role of dietary changes in managing chronic disease, medicines management was their primary focus. For some, nutrition advice is a secondary concern or falls outside of their scope of practice, with some saying “I don’t feel there is much scope for pharmacists to hand out dietary information, other than basics”.

However, the majority felt the provision of basic information about nutrition was within scope.

“I would not necessarily feel that pharmacists should be the primary source of nutrition information any more than dietitians should be a primary source of drug information. That being said, there is an important educational role for pharmacists in relation to nutrition. But I believe we should be able to refer patients much more easily to dietitians”.

Table 3
Themes from the free text comments regarding nutritional competency and training.

Theme	Subthemes /Quotes
Interprofessional collaboration	1. Signpost and reinforce messages from dietitian 2. Need to strengthen the community nutrition care
Challenges to nutrition care	1. Limited/lack of time to provide nutrition care to patients and stay up to date with nutrition advice 2. Nutrition advice is not within the scope of pharmacy practice 3. Need for simple written information for patients from non-commercial sources
Nutrition education development	1. CPD course in nutrition would be valuable 2. Incorporate nutrition modules in university pharmacy programmes

Participants cautiously identified several different areas where they provided nutrition care in community pharmacy such as basic healthy eating advice, measuring weight, chronic disease management, most notably for type 2 diabetes and kidney disease, and advice on vitamins, and minerals, and malnutrition. Some pharmacists were skeptical about the sale of nutritional products from pharmacy without dietitian input, providing advice for weight loss and felt they lacked knowledge to create meal plans.

Written materials to help support consultations were requested, “We need to have simple information to give and some quality handouts for different types of patients”. One participant cautioned that there is a lot of misleading information readily available on this topic, written from the perspective of commercial interests or “consumer driven”.

3.3. Nutrition education development

Many of the participants felt that nutrition education should be incorporated at university pharmacy programmes. Others were interested in developing their own knowledge post-graduation. Participants mentioned a variety of educational activities including lectures, workshops, information evenings, Masters courses and distance learning/online training.

4. Discussion

This study provides a description of the self-perceived nutrition competencies among registered pharmacists in Ireland. Overall, this study found a largely positive attitude by pharmacists towards providing dietary advice, particularly supporting patients to implement recommendations from a dietitian or other health professional. The majority of pharmacists were ‘somewhat confident’ in their knowledge of nutrition and skills to provide nutrition care. Advocating for healthier eating was seen as an effective use of their professional time and within their scope of practice for the majority. However, nutrition care may not always receive attention as participants were keen to stress that their primary focus is on managing medicines and time constraints do not permit additional advice. Even though more than half of respondents (60%) reported receiving some nutrition education, there was an interest in further nutrition knowledge specifically in oral nutritional supplements, disease specific training and multivitamins commonly requested by clients. Given the varying levels of nutrition education received by participants either formally or informally, and the lack of benchmarking of nutrition knowledge, variation in competence is hardly surprising and leaves opportunity to improve the nutritional education of pharmacists. Furthermore, respondents expressed a desire for greater interprofessional working with and availability of dietitians in primary care. So, while greater competence in nutrition care was seen as useful by pharmacists, implementing nutrition care in practice also requires consideration of time and community resources.

The positive association between nutrition education and greater confidence in nutrition knowledge, skills, attitudes and counselling and communication techniques was broadly in line with previous studies.^{29,30} A low confidence in keeping up to date with peer-reviewed evidence in nutrition and chronic disease and the ability to formulate a meal plan for individuals was reported in our study. Similarly, low confidence in these questions have been reported in other studies on a mixed samples of qualified healthcare professionals^{29,31} and personal trainers.³² Staying up to date with fast growing scientific literature is a challenge facing all health professionals.³³ Conversely, study participants reported the most ‘extremely confident’ responses for interpreting an individual’s biological data against reference ranges and maintaining non-judgmental attitudes in discussions with patients regarding the foods they usually eat (16.9% and 15.3%, respectively). This is likely because pharmacists have prior training and knowledge in these areas. For example, a considerable amount of literature has been published on the common biological measurements carried out in pharmacy practice which includes cholesterol, blood pressure, fasting blood glucose, HbA1c, body mass index, and waist circumference,^{34–36} aligning with the competence reported by pharmacists

in this study. Furthermore, counselling skills are a key competency outlined in Irish pharmacists’ core competency framework.³⁷

There were some conflicting views on the delivery of nutrition care. While participants acknowledged the benefits of up-to-date nutrition education on patient outcomes and recognised the need for introducing more nutrition education to strengthen their nutrition competencies, they reported being time-poor to act on it. Likewise, favourable attitudes are often reported by other healthcare professionals towards nutrition counselling, along with similar concerns about not having adequate time to provide nutrition care.^{38,39} Also, a minority thought the provision of nutrition care was outside of their scope of practice. This could be due to the structure of service provision or personal interests. A pharmacist is expected to be competent to engage in health promotion under the core competency framework,³⁷ but the activities are left ambiguous with room for self-development. Some pharmacists are choosing to move towards health promotion from the more traditional medicine management related activities,⁴⁰ and health services are shifting to enhance chronic care management in the community.⁴¹ However, there remains a need to clarify the role of pharmacists in nutrition care in order to make high quality nutrition advice more readily available and gather evidence that such services should be reimbursed by the health service.⁵

Furthermore, the challenge of insufficient dietitian referral pathways and lack of availability of dietitians have been identified previously.⁷ Inter-professional collaboration to deliver nutrition care has progressed in certain areas such as cancer⁴² and palliative care,⁴³ however there is still room for improvement to drive dietary change and public education and identification of patients at risk of malnutrition.^{2,44,45} Incomplete patient records and lack of shared communication between primary care providers has been highlighted as limiting the provision of clinical services by pharmacies.⁴⁶ Some feasibility studies have been carried out⁴⁶ including in the area of nutrition, but their application in community pharmacy practice in Ireland is as of yet non-existent.

Other studies have also confirmed that the lack of available patient information materials supplied in practice is an issue faced by healthcare professionals to provide effective nutrition information to service users, including pharmacists.^{18,47,48} Those available are often supplied by companies promoting a product, as had been noted in a recent study.² This is concerning given that patient information leaflets are perceived to be valuable for improved health-related knowledge and satisfaction.^{49,50}

A greater emphasis is needed within primary care on interprofessional collaboration in the area of nutrition, as has been identified in previous studies.^{2,7} Increased referrals between pharmacy and dietitians may require some training about when to refer. A recent paper found that pharmacists often interact with patients with nutrition concerns presenting for supplement advice,¹⁴ which should be considered as an opportunity for identification of someone at risk and early intervention. Interprofessional undergraduate education can play a role to improve collaborations across disciplines in primary care.⁵¹ As mandated by the regulatory act of dietitians, dietitians are expected to educate other healthcare professionals on evidence-based nutrition⁵² and there is certainly a potential for dietitians to educate pharmacists in this regard.

4.1. Strengths and limitations

The NUTCOMP questionnaire is a reliable and valid questionnaire that adds strength to this study in terms of accuracy of the self-perceived nutrition competencies. The nature of the cross-sectional study design is relevant for assessing self-perceived nutrition competencies among pharmacists. Numerous limitations of the study have been noted. Some participants reported to have completed a certificate or other non-degree programme in nutrition.

Therefore, it is unknown the length and complexity of these courses in terms of nutrition content and evidence-based learning. This may possibly impact the generalisability of the results. Likewise, the sample rate was low at 14.9%, which also means results may not be generalisable to the entire Irish community pharmacy population. The method of data collection

was based on self-reported answers and may be prone to bias. While the face validity, internal consistency, concurrent validity and test-retest reliability of the questionnaire have been reported elsewhere,¹ a study to understand the predictive validity of the questionnaire would be worthwhile. Participants who completed the survey may have had a greater interest in nutrition. Furthermore, 60% of respondents had completed a programme with some nutrition education which could have led to skewed results. There were more female responses compared to males. This is reflective of the national pharmacist register in Ireland, where 65% of pharmacists represent females workers.⁵³

4.2. Implications for future research and practice

Pharmacists, dietitians, and educators could be involved in designing a nutrition-based training programme for pharmacists. The validity of the NUTCOMP questionnaire can allow for continuing education activities to be tailored to the needs of participants based on pre nutrition intervention scores. Nutrition materials in the form of handouts or leaflets could be improved to declare commercial interests and be made more widely available. Improved implementation of malnutrition screening and nutrition care pathways across primary care settings including community pharmacies, and improved direct links between dietitians and pharmacists would be welcome.

5. Conclusion

Most pharmacists reported being somewhat confident in their nutrition knowledge, skills and attitudes. Additionally, this study shows most pharmacists have undertaken some nutrition education. There are opportunities to improve formal nutrition education, however the findings suggest that increasing the delivery of nutrition care in a pharmacy setting requires more than increasing competence alone. There were calls for increased time for health promotional activities related to nutrition care, improving the quality of written dietary information available and the development of more direct links between dietitians and community pharmacists in practice. Dietitians may enhance patient care and improve pharmacist confidence for nutrition delivery. Through their broad exposure to the general population of Ireland, the workforce of pharmacists to deliver nutrition care to both healthy patients and patients with chronic diseases may prove valuable.

Contributions

Supervisors AG and DK identified the novel research theme of interest. Ethical permission and adaptation of the questionnaire was sought by AG and DK. Questionnaire was previously assessed and designed by Ball and Leveritt 2015. DK had access to the Pharmaceutical Society of Ireland (PSI) database for the purpose of disseminating the questionnaire to all registered pharmacists working in Ireland. JC investigated the literature, designed recruitment email and created questionnaire items on Qualtrics software system. Data collection, processing and analysis was managed by student JC. AG and DK commented on research project progress and provided feedback on draft written paper.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.rcsop.2022.100203>.

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