Exploring Australian Dietitians' knowledge, experience and perspectives of time-restricted eating in private practice: A qualitative study

Caitlin Pye | Evelyn B. Parr | Steve A. Flint | Brooke L. Devlin

Summary

Time-restricted eating is a novel nutrition intervention with evidence of beneficial effects on weight loss, blood glucose management, and other metabolic health outcomes. Adherence to time-restricted eating is higher than some traditional nutrition interventions to support individuals living with overweight/obesity and type 2 diabetes mellitus. However, there may be an evidence-practice gap of time-restricted eating in Australian dietetic practice. The present study aimed to explore dietitians' knowledge, experiences, and perspectives of time-restricted eating and timing of eating advice in practice. Semi-structured interviews with 10 private practice dietitians across Australia were conducted. Audio recordings were transcribed and analysed thematically. Six themes were identified: (i) distinction of time-restricted eating to other fasting protocols; (ii) knowledge of health benefits of time-restricted eating; (iii) patient-led advice frequently given: timing of breakfast and dinner; (iv) dietitian-led advice frequently given: eating cut-off time to avoid late night snacking; (v) barriers and facilitators to offering time-restricted eating or timing of eating advice; (vi) timing of eating advice within professional guidelines and resources. These findings suggest the need for development of professional resources and educational development tools for dietitians on time-restricted eating.

KEYWORDS
barriers, chrono-nutrition, implementation, time-restricted eating

What is already known about this subject?
• Chrono-nutrition is the interactions between what, when, and how much we eat.
• Dietary guidelines focus on what and how much we eat and omit information on when to eat.
• Time-restricted eating, which focuses on when we eat, is a novel dietary intervention that has beneficial effects on weight loss and metabolic health.

What this study adds
• Identifies an evidence-practice gap and the barriers to translating time-restricted eating interventions into dietetic practice.
1 | INTRODUCTION

Healthcare systems have scope to provide better support to individuals living with obesity to induce weight loss and moderate their risk of developing complications or co-morbidities. Diet plays a key role in weight management and is a modifiable risk factor in the onset and progression of co-morbidities such as Type 2 Diabetes Mellitus (T2DM). First-line nutrition and lifestyle interventions to support individuals living with overweight/obesity have typically focused on changes in dietary quality, macronutrient composition, and reductions in energy intake. However, these interventions often have low adherence due to requiring constant attention to food quality and quantity.

Evidence is growing to support the effectiveness of diet interventions that focus on timing of dietary intake (i.e., chrono-nutrition) for weight loss, blood glucose management, and metabolic health outcomes. Time-restricted eating (TRE) is a novel dietary approach wherein food intake is typically limited to an 8–10 h window within the waking phase of a 24-h cycle. The focus of TRE is typically on the timing of intake, rather than the type, quality, and quantity of foods. As the overall time available for food intake is reduced, this leads to potential reduction in total energy intake, a key determinant of weight loss. Furthermore, TRE may present a distinct application to post-industrial society, which is often characterised by eating patterns that are erratic and of poor quality. Research has shown that erratic or prolonged eating windows play a significant role as a circadian rhythm disruptor (CRD).

Circadian rhythms are present in almost all tissues and cells, driving daily rhythms of metabolic consequence, such as hormone patterns involved in glucose homeostasis. Chronic CRDs, such as prolonged or erratic nutrient intake, may lead to compromised organ function, potentially linking to glucose intolerance, body weight gain, adiposity, and increased risk for liver disease, cardiovascular disease, depression, Alzheimer’s disease, and various forms of cancer. Inversely, TRE, which promotes eating in line with diurnal rhythms of hormones, has been shown to reinforce molecular circadian clocks, optimising organ function, and metabolism. TRE, therefore, supports health benefits such as weight loss, improved blood glucose management, and mediation of hypertension and dyslipidaemia. TRE may also reduce risk and severity of other metabolic diseases, such as hepatic steatosis and age-related decline in cardiac function. Importantly, whilst evidence shows promising health benefits, there is limited long-term data on the effectiveness of TRE for sustained weight loss and maintenance.

TRE presents a dietary intervention that can be implemented alone or as an adjunct to traditional dietary management to support individuals with overweight/obesity and T2DM, with typically high levels of adherence shown. However, there may be an evidence-practice gap of TRE in Australian dietetic practice. Accredited Practising Dietitians (APDs) in Australia are university qualified to provide individualised dietary advice to optimise diet quality and composition, promote health, and combat disease, with well-established, evidence-based guidelines in place and are eligible to receive Medicare subsidies within the Australian healthcare system. As evidence grows in the literature, TRE is driving more interest within the general population. Anecdotally, likely related to increased interest in TRE and meal timing in the general media, APDs are increasingly being asked for advice on implementing eating within established time windows or prolonging time between eating and sleep or waking and eating. However, advice on when to consume food for optimal health is currently lacking in practice guidelines. Without guidelines translating evidence to best practice, the approach, if any, on implementing TRE interventions among Australian dietitians may be inconsistent.

Focusing on when to eat (through TRE) is a promising and scalable approach involving simple guidance around temporal intake of food. Advice on when to eat could be incorporated into usual care by any health professional and may reduce barriers and facilitate behaviour change with the added benefit of aligning intake with daily circadian rhythms. Improving self-efficacy with small achievements in TRE may promote further dietary-related changes and other health-promoting behaviours. TRE could indeed complement standard dietary practice that focuses on improving dietary quality. While several studies have investigated perspectives on TRE participants following a TRE intervention, to our knowledge, no studies have investigated the perceptions and attitudes of any nutrition professional on TRE in practice. If TRE advice is to be potentially incorporated into practice as the evidence builds, it is important to explore the attitudes of APDs, who will pioneer the implementation of effective TRE strategies. Thus, the aim of the current research study was to understand the knowledge, experience, and perspectives on TRE of APDs in private practice, and the barriers and enablers for incorporating TRE advice within individualised dietetic counselling.

2 | METHODS

This qualitative study was set in the constructivist-interpretive paradigm, seeking to explore participants’ subjective understanding of
Cross-sectional, semi-structured interviews with Australian dietitians in private practice were undertaken between October and November 2022. The study received ethical approval from the participating university (University of Queensland Human Research Ethics Committee: 2022/HE001722).

Participants were Australian APDs working in private practice (i.e., conducting one-on-one consultations with patients in the community). Eligibility criteria to participate in the survey included working in private practice at least 1 day a week within Australia. Verbal consent was provided by each participant at the beginning of the interview. Characteristic information was gathered for the participants sampled, including region (state) practicing, years of experience, and primary case load or case mix. Convenience and snowball sampling were used for recruitment. Dietitians were contacted via advertising flyers, and snowball sampling supported gathering additional participants. Sampling continued until data saturation was reached.

A semi-structured interview guide was developed based on reviewing relevant literature and prior research conducted. Video interviews were conducted online by the leading member of the research team (BLD) who is an APD researching TRE but not previously acquainted with the interviewees. The interviews were audio recorded and transcribed verbatim for analysis. Example of the semi-structured interview questions are shown in Table 1.

Participants were provided the opportunity to review transcripts prior to them being imported into NVivo (NVivo qualitative data analysis software, Version 12, QSR International 14 Pty Ltd., VIC, Australia). Data was then analysed using thematic analysis and was guided by the consolidated criteria for reporting qualitative research (COREQ). Data analysis was exploratory and inductive, and followed phases of reflexive thematic analysis, including: (i) familiarising with the data; (ii) generating initial codes; (iii) searching for themes; (iv) reviewing themes and (v) defining themes. As reflexive thematic analysis has been described as a flexible, yet accessible and useful, way to extract a detailed account of qualitative data, it was deemed by the research works as an appropriate tool to discover and highlight themes in the current study. Meetings were conducted with two members of the research team (BLD, CP) throughout data analysis to review and refine primary themes and ideas. Agreement was reached at the closing of these meetings that themes and chosen quotations were reflective of the data. This increased methodological rigour by allowing a phase to check individual researcher bias. Additionally, direct quotes from transcripts were included to demonstrate researchers’ interpretation of raw data.

3 RESULTS

Ten APDs working in private practice within Australia participated in the interviews. Eight dietitians were female with a mean of 8.3 (SD = 4.3) years’ experience in practice (Table 2). Combined, predominant caseloads were varied across dietitians (Table 2).

Interviews lasted between 15 and 27 min. Six themes with various subthemes were identified regarding dietitians’ perspectives of TRE and timing of eating advice in private practice: (i) distinction of TRE to other fasting dietary protocols; (ii) knowledge of health benefits of TRE; (iii) patient-led advice frequently given: timing of breakfast and dinner; (iv) dietitian-led advice frequently given: eating cut-off time to avoid late night snacking, and timing as part of holistic care; (v) barriers and facilitators to offering TRE or timing of eating advice; (vi) timing of eating advice within professional guidelines and resources (Table 3).

3.1 Distinction of TRE to other fasting dietary protocols

All dietitians reported background knowledge on TRE, and nine participants clearly differentiated between TRE and intermittent fasting (IF). Most dietitians described knowledge of TRE being limited (e.g., a “background understanding”) but referred to self-directed professional development, occurring as a result of patients bringing up specific fasting protocols and/or reporting in the media, as the reason behind gained knowledge. Dietitians characterised TRE as being more “consistent” (i.e., occurring daily) and “structured” than IF.

[A benefit] that would come to mind would be weight loss because it’s a way to facilitate a calorie deficit, and how that then flows onto some of the [other] benefits. (P7)

But I think that that still has some benefits in that it’s made people lose weight because they’re not having the snacking in the evening. (P9)

3.2 Knowledge of health benefits of TRE

3.2.1 Weight loss

The knowledge of health benefits of TRE varied. Seven of the dietitians stated they were aware of or perceived a benefit of TRE to be weight loss with an energy deficit created by a restricted eating window cited as being the major (or only known) mechanism. The second most common perceived reason cited for weight loss was a reduction in late-night snacking (i.e., reduced discretionary foods).

3.2.2 Circadian rhythm

Six of the dietitians stated an awareness of benefits of TRE in regulating circadian rhythm. However, dietitians stated they were not fully...
aware of the mechanism and would like to know more before educating patients. Effect on circadian rhythm was linked by some dietitians to their perception of a rationale for weight loss. (P7)

The whole premise of it is that it’s not a fad, it’s more the physiological reasoning behind it, that you’re eating in line with the circadian rhythm ... which then might flow on and have other health benefits. (P3)

There’s more coming out about our circadian rhythm ... and food. How, if we eat irregularly, it can cause disturbances in our body and physiology to then cause obesity and type two diabetes, et cetera. (P7)

<table>
<thead>
<tr>
<th>Concept</th>
<th>Specific concept</th>
<th>Questions</th>
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| Demographics | Dietetic workload and experience | • Do you work full-time or part-time?  
• How many days per week do you work in private practice?  
• How long have you been working as a dietitian? |
| Patient load/case-mix | | • In what area of private practice do you work? What is your main case load? |
| Private practice structure | | • Do you run your own private practice or work for a larger organisation?  
• In your practice, how long are your initial and review consultations? |
| Knowledge and perspectives of TRE | General knowledge of what is TRE and knowledge of health benefits | • Can you tell me what you know about TRE? (Prompts: how do you describe it? Are there any benefits you know of?) |
| Distinction between TRE and IF/other fasting protocols | | • Can you tell me what you know about IF? (Prompts: how do you describe it? Are there any benefits you know of?)  
• What do you perceive to be the key differences between TRE and IF? |
| Investigating knowledge gaps | | • Is there anything about TRE that you would like to know more about? |
| Experience of TRE | General experience of TRE advice (popularity) | • Do you have patients ask or mention TRE (or IF) in their consultations? Can you explain an experience if this has occurred?  
• Can you tell me about any experiences with TRE in practice with patients? |
| Facilitators and barriers | | • Are there any circumstances where you would encourage TRE? Or discourage?  
• Are there any enablers or barriers to providing advice regarding TRE in practice?  
• Can you tell me about how and why you may approach implementing TRE in practice? (Prompt: are there any key references or resources you use?) |
| Opinions towards importance of general timing of eating advice and who may benefit | | • In your practice, do you currently have patients ask about the time to eat meals? If so, what type of patient? (Prompt: what are they trying to achieve?)  
• In your current practice, do you provide ‘timing of eating’ advice to any patients?  
• Can you tell me if you feel there are any patients who may be better suited to receive ‘timing of eating’ advice?  
• Are there any barriers or enablers to providing ‘timing of eating’ advice in your current practice? |
| Opinions of timing of eating advice in guidelines and resources | | • Do you feel timing of eating advice is currently lacking from guidelines or professional resources?  
• Do you foresee that timing of eating advice could be implemented into guidelines if consistently shown to be beneficial?  
• Can you tell me if you would find established guidelines on timing of eating advice beneficial for your practice if they were to be developed? |

Abbreviations: IF, intermittent fasting; TRE, time-restricted eating.
late-night snacking cited as a common patient-reported problem. Another benefit of TRE was also perceived in building self-efficacy, facilitating patients to make bigger changes to their diets.

[Clients] finish eating by seven or eight o’clock, and that way they’re not snacking in the evening. (P3)

[Timing of eating advice benefits] those who have struggled to make changes and might need something to build self-esteem and a bit of momentum before they can make more complex changes. So, it might be the first step in some changes. (P5)

3.2.4 | Blood glucose management

Improvements in blood glucose levels was perceived by two dietitians as a benefit of TRE. Both dietitians linked this to effects on circadian rhythms, however, were unsure of the complete mechanism. Blood glucose management was mentioned with other metabolic effects, either as the broad phrase itself or specified effects, such as appetite.

There are improvements in blood glucose and a range of other metabolic markers … There’s enough there to warrant that perhaps there’s something going on that we could possibly pass on to patients, and they might have some benefits. (P9)

3.3 | Patient-led advice frequently given: timing of breakfast and dinner

All 10 dietitians reported they had experienced patients asking about timing of eating advice which resulted in patient-led advice provided. The most common query from patients related to whether they should eat breakfast soon after waking. Dietitians cited that the predominant reason for patients being concerned was a lack of hunger upon waking. Timing of dinner was the second most common reported patient question, with reports of patients conscious of keeping an adequate window of time before bed.

People ask often what time to eat their breakfast, and what time to eat their dinner. So, I probably do encourage that to an extent. But I don’t call it time restricted eating, just adjust time of their meals if it could be improved around their current schedule and commitments. (P4)

‘People quite regularly ask about when to eat ... Do they have to eat breakfast, and if they do have to eat breakfast, do they need to eat it as soon as they wake up because sometimes they’re not hungry ... is it better to eat dinner earlier and have some time before they go to sleep. So, that’s quite common. (P5)

3.4 | Dietitian-led advice frequently given: Eating cut-off time to avoid late night snacking, timing as part of holistic care

It was identified that dietitians gave advice in their practice that focused on timing of eating. Eight of the dietitians stated timing of eating was integrated into their assessments or interventions with patients. Some expanded that advice focused on avoiding late-night snacking, with a time to ‘close the kitchen’ being the approach offered. Dietitians reported giving advice to adopt a cut-off time for eating in the evenings occurred a lot in practice, with a frequent number of patients seeming to struggle in this domain. Dietitians referred to timing of eating advice as an ‘integrated component of care’ or ‘existing (inexplicitly) as a part of the dietitian’s holistic assessment and advice’. Many dietitians stated that they ‘wouldn’t call it time-restricted eating with the patient’ but that this would form a part of the process.

I wouldn’t say go ahead and do time restricted eating, but I think for people who snack late into the evening, I would commonly suggest that a time in which they stop eating. Have a nice dinner. Have something after dinner, if they’re so inclined ... leave it, as a minimum, two hours before they go to bed. (P2)
## TABLE 3  Overview of themes and subthemes generated from semi-structured interviews with Accredited Practising Dietitians exploring perspectives, knowledge, and experience of time-restricted eating in private practice.

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<td>Distinction of TRE to other fasting protocols</td>
<td>'Intermittent fasting might be every second day, or a couple of days a week, spread out. Whereas time-restricted eating is a more consistent approach to eating within a time window.' (P6)</td>
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<td>Knowledge as both a barrier and facilitator</td>
<td>'I think the main issue is I am not across the evidence in this space, as it seems to be moving rapidly.' (P1)</td>
</tr>
<tr>
<td>Time as a barrier: consult time and professional development time</td>
<td>'[The main barrier to providing advice is] more knowledge or information ... me just catching up on what the benefits are, because there may certainly be some patients who are well suited to it ... knowing a little bit more would help me.' (P8)</td>
</tr>
<tr>
<td>Lack of resources as a barrier</td>
<td>'[A barrier to providing timing of eating advice is insufficient] time within a consult. There's only so much you can talk about, and you don't want to overwhelm the patient, you want it to be very client-centred in what they're trying to do.' (P2)</td>
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3.5 | Barriers and facilitators to offering TRE or general timing of eating advice

3.5.1 | Knowledge as both a barrier and facilitator

Several barriers and facilitators to offering TRE or timing of eating advice were identified, including knowledge as both a barrier and facilitator; time as a barrier; and, lack of resources as a barrier. Knowledge was both the most reported barrier and enabler of dietitians being able to offer patients detailed advice on timing of eating. Nine of the dietitians reported knowledge as a key barrier, with many describing a gap in their current knowledge of both the evidence emerging within the TRE field as well as the physiological mechanisms underpinning its health benefits. Five dietitians described knowledge as both a barrier and an enabler. Many dietitians assumed responsibility to develop more knowledge of the literature within their own professional development hours, whereas others also considered a professional or public resource on TRE would be helpful.

That physiological mechanism that’s underpinning it is somewhat lacking [within my] understanding at the moment, which might be a barrier. What might enable [providing timing of eating advice] is knowledge. (P7)

I think the main issue is I am not across the evidence in this space, as it seems to be moving rapidly. (P1)

[The main barriers to providing advice are] more knowledge or information ... me just catching up on what the benefits are, because there may certainly be some patients who are well suited to it ... knowing a little bit more would help me. (P8)

3.5.2 | Time as a barrier: Consult time and professional development time

Dietitians found it difficult to provide timing of eating advice due to constrictions with time: both within patient consults and within professional development time. Whilst dietitians often placed the responsibility on themselves to further develop their knowledge surrounding TRE, many additionally reported inadequate or restricted capacity within their working hours to facilitate this. Dietitians discussed factors such as a demanding caseload within their working hours, there being a vast amount of literature ‘to be across’ without adequate time to ‘deep dive’; and, finally, professional development time being limited. Therefore, the dietitian’s values or what was most relevant to their caseloads would take precedence.

Dietitians perceived there were many competing priorities within patient consults, with consult time already being experienced as limited (some had reported recently shortened consult times for reasons of maintaining profitability, time being as restricted as 20 min per review and 30 min with the patient per new consult). Consequently, dietitians considered other factors usually took higher priority for patient education and intervention planning than timing of eating.

[A barrier to providing advice regarding timing of eating is insufficient] time within a consult. There’s only so much you can talk about, and you don’t want to overwhelm the patient, you want it to be very client-centred in what they’re trying to do. (P2)
So, I guess it comes down to the practitioner and what they value and what time they have available. (P7)

3.5.3 | Lack of resources as a barrier

Some dietitians perceived they needed to build their own knowledge of TRE through familiarisation with the literature, whereas others discussed lack of professional and educational resources as a barrier. Dietitians reported a resource encompassing clear definitions, schematics of the benefits, and a summary of the evidence would enable them to provide timing of eating advice to patients. Additionally, dietitians outlined resources that would be helpful for patient education and facilitating patient adherence, supporting patients to clearly link the approach with the physiological benefits.

[A barrier or enabler to providing timing of eating advice is] a bit more knowledge in the area. Some definitions and some clear kind of schematic or image on the benefits, so that you can use it for patient education. That often might help facilitate adherence to the not snacking in the evening. So, barriers might be knowledge and some resources. (P4)

I just don't really have time in my workload to really deep dive into it. So, a summary of it would be helpful. (P2)

3.6 | Timing of eating advice within guidelines and resources

Interviews highlighted TRE or timing of eating practice-based tools and resources would facilitate timing of eating advice being implemented where appropriate. All 10 dietitians stated professional guidance and resources on timing of eating would assist them. It was considered that the development of practice guidelines would provide a reputable ‘consensus’ which would translate research into evidence-based practice for dietitians and/or other health professionals, assist dietitians to stay up to date with emerging evidence and assist with effective care for better patient outcomes.

Additionally, it was stated reputable patient resources would complement any developed practice guidelines to assist implementing timing of eating advice in practice. Dietitians perceived providing resources to patients fostered empowerment and reinforced messages provided in session, with resources providing a patient-friendly summary.

Being an evidence-based profession, in our practice we try and keep up to date with the literature and use that to inform our clients and patients. And so, having a nice resource and a summary of where things are at would definitely be beneficial. (P3)

It would just collate all the latest literature in the space so that we can continue to be an evidence-based profession and stay up to date with how the research in the area is advancing, and actually using it to make a positive difference. (P4)

I think I would need the guidelines, but then also resources and information sheets that I could use to implement the guidelines in order for it to be really effective in practice. (P10)

3.6.1 | Addressing timing of eating in dietary guidelines

Dietitians highlighted many within the population could benefit if timing of eating advice was incorporated into dietary guidelines. It was perceived that general advice on structure and a guideline relating to timing between consumption of a final meal and bedtime or length of overnight fast would be particularly helpful. Dietary guidelines were discussed as a tool to encourage healthful behaviour at a population level. Incorporating general guidance on timing of eating was equated with guidance on including nutritious foods from the five food groups daily. Without inclusion in guidelines, it was stated that many in the population ‘wouldn’t know of its potential importance’.

If it’s worth from a population health perspective with that there’s improvements in everybody, then yes, it could be encouraged, and guidelines ... like a time to start eating breakfast and a time to finish eating by each day to then facilitate like a certain period of overnight fast. That sort of advice could be in guidelines because it’s just a guideline, and if people can follow it, there’s no harm. But if they don’t, or if they do it on some days of the week, then it’s still going to be possibly beneficial. So yes, that’s how I could see it sitting into the guidelines. (P5)

4 | DISCUSSION

This is the first study to investigate Australian APDs’ knowledge, experiences, and perspectives of TRE in private practice. The results of this qualitative study show an evidence-practice gap for TRE and timing of eating advice within Australian dietetic practice. Many dietitians reported wanting to improve their knowledge before incorporating TRE advice into practice, with 90% of dietitians stating knowledge as a specific barrier. Additional barriers included a lack of professional development time and lack of access to professional guidelines and resources to translate TRE evidence to practice.

In the current study, dietitians reported a broad understanding of the health benefits of TRE, identifying outcomes such as weight loss either with or without caloric deficit, keeping the circadian rhythm...
“aligned”, and blood glucose management. TRE, which promotes eating in line with circadian rhythms, has shown numerous metabolic benefits without reducing energy intake, such as reducing body weight and improving blood glucose management, hypertension, and dyslipidaemia. Alignment of eating with circadian rhythms has been the major mechanism said to drive these benefits, with the adaptation of metabolic processes to oscillating factors in a 24-h cycle resulting in optimum times for eating.7

A prominent theme was found where dietitians perceived they required further development of knowledge of TRE before they could confidently translate this knowledge and advice to patients in practice. A previous study investigating the confidence of dietitians to translate diet-gene interactions, another recently emerging field, found low levels of knowledge, confidence, and involvement in dietitians.32 Indeed, low confidence and knowledge in emerging fields such as TRE may pose a problem as these professionals are involved in interpreting and translating nutritional science as a component of patient care.32

Previous studies have also found dietitians lacked confidence and skills in providing dietary advice and evidence translation when the topic was not a focus during their university education as this relies on self-directed learning or knowledge sharing by colleagues.33,34 Improved facilitation and better support surrounding education and training offered for dietitians to improve knowledge, skills, and confidence around TRE and timing of eating advice should form part of future direction for the Australian APD community. Education and training may widen the knowledge of the patient groups that would benefit and areas of potential application. Well-designed professional development tools and resources (and promoting awareness of their availability) may minimise the time cost of building knowledge surrounding TRE.

Lack of access to professional resources was a major barrier to routinely providing chrono-nutrition advice within dietetic consults reported in this study. Dietitians reported that practice guidelines, direction to evidence summaries, and professional resources would assist translating TRE evidence. Whilst some dietitians perceived a duty to stay current with the literature, most dietitians reported a significant barrier being time within their working hours. Previous research has found similar barriers for dietitians which contribute to an evidence-practice gap.35–38 A similar study to the current report investigated whether the Mediterranean Dietary Pattern (MDP) was integrated into routine dietetic practice, which involved an online, mixed methods survey of 182 Australian APDs. Similarly, an evidence-practice gap was highlighted, with <50% of surveyed dietitians counselling relevant patients on MDP in the majority of their practice.33 Like findings in the current study, competing priorities and limitations with time were a barrier to staying current with scientific literature, with direction to professional resources and clinical guidelines identified as enablers to counselling patients on MDP.33 Endorsed resources may provide a summary of TRE research, supporting contemporary knowledge to be confidently relayed to patients and applied in practice. Furthermore, incorporating TRE or timing of eating advice within professional best practice guidelines may support applications grounded in evidence-based practice and provide consensus and continuity among dietitians nationally.

Interestingly, dietitians suggested there may be other beneficial outcomes of implementing TRE such as reduced late-night snacking and improved self-efficacy. Self-efficacy may be a useful predictor of behaviour change. A previous study investigating the effect of self-efficacy on health behaviour and weight-loss outcomes found that self-efficacy during the early stage of an intervention predicted later success.37 This may suggest possible broad applications for TRE, including its potential use for building self-efficacy to bolster later weight loss or health outcomes.

Dietitians perceived there was a place for timing of eating advice within the Australian Dietary Guidelines (ADGs). Aligning with the evidence that application of TRE is often considered feasible and safe,7 the perception was that providing general, overarching advice on timing of eating would not be harmful and that the decision may remain with individuals as to whether to adhere to this advice. The purpose of the ADGs is to attenuate risk for chronic diseases and promote improved health outcomes in the general population.38 Considering evidence surrounding erratic nutrient consumption as a CRD, the increased risk factor to many chronic metabolic diseases due to CRDs, and the potential to mediate this risk and promote optimal health with TRE,7 including timing of eating advice within the ADGs is warranted. Dietary timing guidance may comprise the recommendation to consider an adequate overnight fasting period.7 This aligns with evidence that suggests melatonin levels are still declining within the first few hours post waking and that food intake coinciding with higher melatonin levels contributes to impaired glucose tolerance.39,40

The current study highlights an evidence-practice gap in Australian dietetics, with significant barriers to prescribe being knowledge of TRE application and benefits, lack of professional resources, and lack of time to pursue professional development in this area. As was requested by dietitians in this study, future direction should focus on building easily accessible professional development courses that provide a summary of the research and how it may be applied in a clinical setting. Embedding TRE and timing of eating advice into professional resources, clinic-based tools, and best practice guidelines may also facilitate implementation and promote consensus. It is recommended future studies first seek to further explore and understand the attitudes of current practicing Australian dietitians on a wider scale, such as by developing and implementing a national survey. Within this wider scale, future research should explore how dietitians individualise their care. Exploring how dietitians personalise dietary approaches focused on timing of eating, will ultimately assist with understanding how TRE advice is being used to provide individualised support to patients in practice. Additionally, exploring the knowledge and attitudes of the wider medical community, such as in general practitioners and nurse practitioners, will likely lead to further insight into if and how TRE and general timing of eating advice can be incorporated into other practitioner settings. Through assisting the progression and translation of emerging evidence into practice as this
study and future direction aim to do, wider effects may be gained in supporting individuals with higher body weight to moderate risk of complications and improve health.

This study was strengthened by its national focus, seeking to represent dietitians in a range of locations across Australia with varying years of experience and patient settings. Additionally, interview questions explored perceived key differences between TRE and IF to explore understanding of the differences in terminology and ensure no ambiguity in questions focusing on TRE. Limitations were discovered within the interview structure, however, and are important to address in future direction. Future research should gather information from dietitians about evidence and data they collected to inform their practice, and additionally, should gather more information to understand dietitians' consultation approach. A limitation with 10 dietitians sampled is that it is unknown if certain demographic groups were underrepresented and if the sample was truly representative of dietitians practicing within Australia. Despite this, thematic saturation was reached in the current study based on the questions asked in the interviews. Furthermore, this study only sampled dietitians working in private practice, therefore the perspectives and findings may not be generalisable to other areas of dietetic practice (i.e., acute care). However, it would be beneficial for future research to further explore this topic with dietitians in the non-private practice setting to gain a wider understanding of the evidence-practice gap within TRE advice. Regarding dietitians sampled, there is a potential respondent bias in those choosing to participate in the study due to an interest in TRE or other fasting protocols. Finally, there is a limitation to applying the present findings in the context of the current evidence base for TRE still developing with majority of research in laboratory-based settings and not conducted in real-life settings.

The present study is the first to explore Australian dietitians’ perceptions of TRE in private practice. The findings suggest an evidence-practice gap exists in Australian dietetic practice. Strategies to support dietitians to provide timely advice within routine practice are needed. Easily accessible online and in-person education should be developed and made available to dietitians in all fields. Resources, guidelines, and education need to contain clear evidenced-based messages so that dietitians can counsel patients consistently. Development of practical, evidenced-based support material for dietitians may simultaneously address two major contributors to the evidence-practice gap—knowledge and professional development time.

AUTHOR CONTRIBUTIONS
BLD conceived the study and acquired funding. EBP, SAF, and BLD developed the semi-structured interview guide. BLD conducted and transcribed the interviews with the participants. Qualitative data analysis was conducted by CP under the supervision of BLD. Defining and naming of themes was done by CP and BLD. CP drafted the manuscript under the supervision of BLD, with EBP and SAF providing input throughout. All authors have approved the final version of the manuscript submitted for publication and confirm the content has not been published elsewhere.

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The authors declare they have no conflicts of interest.

DATA AVAILABILITY STATEMENT
Data are available on request.

ETHICS STATEMENT
The study received ethical approval from the participating university (UQ Human Research Ethics Committee: 2022/HE001722).

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