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Avoiding acute kidney injury in primary care: attitudes and behaviours of general practitioners and community pharmacists in Hawke's Bay

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ABSTRACT

INTRODUCTION: Awareness of the effect of acute kidney injury on patient outcomes and health systems is growing internationally. New Zealand's approach focuses on stopping consumption of 'at-risk' medicines when acute kidney injury has been established and raising awareness of the risks associated with the *Triple Whammy* drug combination.

AIM: To explore current practices and views of Hawke's Bay general practitioners (GPs) and community pharmacists regarding patient education about medicines with potential for contributing to community-acquired acute kidney injury, with a focus on community pharmacists providing patient education regarding when to temporarily withhold 'at-risk' medicines during acute dehydrating illnesses.

METHODS: Two tailored cross-sectional online anonymous surveys of GPs and community pharmacists working in Hawke's Bay were administered between 2015 and 2016. Descriptive statistics were generated from the closed-question responses and manifest content analysis was applied to the free-text responses.

RESULTS: Twenty-two percent (37/167) of GPs and 34% (32/95) of pharmacists responded. Most respondents, GPs (34/37) and pharmacists (25/32), self-reported expertise to educate patients on temporarily withholding 'at-risk' medicines during acute dehydrating illnesses. Twenty-nine (78%) GPs had confidence in pharmacists providing this patient education and 20 (54%) welcomed pharmacist contact regarding a *Triple Whammy* prescription. However, for a variety of reasons, pharmacists did not routinely provide this education or contact GPs.

DISCUSSION: Both GPs and community pharmacists reported they had expertise to provide useful patient education about 'at-risk' medicine use during acute dehydrating illnesses. Dialogue to clarify the role of the two groups would be beneficial to achieve a more coordinated approach to patient care. Relevant strategies and frameworks already exist, but national interprofessional leadership and local application would be beneficial.

Keywords: General Practitioners; pharmacy services; primary health care; counselling practice

Introduction

Acute kidney injury (AKI) affects kidney structure and function and is described as an abrupt onset of renal dysfunction ranging from minor loss of function to organ failure.[1,2] It is associated with increased health-care costs and is a predictor of adverse outcomes, including mortality.[1–5] It has been suggested that as many as two-thirds of all AKI cases begin prior to hospitalisation, termed 'community-acquired AKI'.[1]

AKI is associated with ageing, acute illness, chronic conditions, and certain medicines.[1–3] International clinician guidance recommends advising patients taking an angiotensin-converting enzyme inhibitor (ACEi), angiotensin-II receptor blocker (ARB), or a non-steroidal anti-inflammatory drug (NSAID) to pre-emptively discontinue these medicines temporarily when experiencing acute dehydrating illnesses, as part of a 'sick day plan'.[3,6–8]

The use of a NSAID in combination with an ACEi or ARB or a diuretic is known as a *Double Whammy,* or *Triple Whammy* if all three drug types are used; these combinations are associated with increased AKI risk.[9–11] The Health Quality & Safety Commission's Atlas of Healthcare Variation shows that >22,000 New Zealanders aged >65 years take the *Triple Whammy* combination annually.[12] New Zealand clinicians are recommended to review the appropriateness of medicines for patients at risk of AKI and be prepared to stop treatment if AKI develops.[13,14] Primary care clinician educational material encourages discussing a 'sick day' plan with patients taking a *Triple Whammy* combination and for pharmacists to discuss NSAID-associated risks with patients already taking an ACEi or ARB, with or without diuretics.[15] At present, it is unknown how New Zealand general practitioners (GPs) and pharmacists have incorporated international and New Zealand guidance into their practices to minimise community-acquired AKI.

Community pharmacists professionally support prescribers and patients in the safe and quality use of medicines.[16] The New Zealand Pharmacy Action Plan 2016–2020 focuses on pharmacists collaboratively working within integrated teams to support public health interventions that improve health literacy and reduce medicine harm.[17] In some other countries, pharmacists have professional direction on their role in AKI-associated medicine management and have available to them specific training to support them to undertake this.[6,8,18]

This study aimed to explore the current practices and views of Hawke's Bay GPs and community pharmacists regarding patient education about medicines with potential for contributing to community-acquired AKI, with a focus on community pharmacists educating people to temporarily withhold 'at-risk' medicines during acute dehydrating illnesses. This is phase one of a three-phase study investigating this issue.

WHAT GAP THIS FILLS

What is already known: There is an international focus to reduce the incidence of acute kidney injury, including by providing patient education about 'at-risk' medicine self-management during acute dehydrating illnesses. The New Zealand Pharmacy Action Plan 2016–2020 focuses on pharmacists collaboratively working within integrated teams to support public health interventions to improve population health literacy and reduce medicine harm.

What this study adds: New Zealand guidance recommends clinicians stop 'at-risk' medicines when acute kidney injury is established and implement sick day plans for *Triple Whammy* combinations. GPs sometimes recommend pre-emptive temporary discontinuation of 'at-risk' medicines during acute dehydrating illnesses of patients in their practices, often influenced by patients' age and renal function. Responding GPs generally support community pharmacists providing pre-emptive temporary 'at-risk' medicine discontinuation patient education as part of the dispensing process when either a *Double* or *Triple Whammy* combination is present. Both GPs and community pharmacists have different expectations regarding the level of patient education provided by pharmacists as part of the dispensing function and the pharmacist interventions occurring when they have professional concerns about a prescription.

Methods

Study group

Cross-sectional surveys of GPs and community pharmacists working in Hawke's Bay, New Zealand, were undertaken between 2015 and 2016 using online anonymous questionnaires hosted on the

SurveyMonkey platform (SurveyMonkey, San Mateo, CA, USA).

Recruitment

General practitioners: In September 2015, 167 Hawke's Bay GPs were invited to complete an anonymous questionnaire, with reminders delivered in the Health Hawke's Bay Primary Health Organisation (PHO) weekly email and via the PHO internal Information Portal. GPs who met with the PHO Clinical Advisory Pharmacist (Dianne Vicary) until August 2016 were sent a personal email invitation.

Pharmacists: In September 2015, an email invitation was sent by the Hawke's Bay Chief Pharmacist to two pharmacy email distribution lists consisting of 95 individual pharmacists and community pharmacy owners. Reminders were emailed and the survey was promoted at monthly pharmacist meetings until November 2015.

Study design

Both questionnaires consisted of a mixture of Likert scale, multiple choice, and open-ended questions (see Supplementary Materials Tables S1 and S2, available at the journal's website). Although both questionnaires explored current practices around patient education, questions relating to views on pharmacists as patient educators, management of *Triple Whammy* risk and demographics reflected the roles of the two groups. Three pharmacists and a GP piloted the surveys for question clarity and face validity, resulting in wording changes to remove ambiguity.

Data analysis

Descriptive statistics were generated from analysis of all closed question responses using Microsoft Excel (2007) (Microsoft Corporation, Redmond, WA, USA). Free-text responses describing perceived barriers to providing education regarding patient pre-emptive temporary 'at-risk' medicine discontinuation were categorised and quantified using an inductive approach and manifest content analysis.[19,20]

Results

Demographics of respondents

Thirty-seven GPs and 32 pharmacists completed questionnaires. Although considerable demographic data were missing, respondents tended to be older (aged 51–60 years) and GP respondents tended to be employers who completed their undergraduate studies overseas, whereas pharmacist respondents tended to be employees having completed undergraduate training in New Zealand (Table 1).

Current expertise and practice for educating patients to temporarily withhold 'at-risk' medicines during acute dehydrating illnesses

Thirty-four GPs and 25 pharmacists felt they had the expertise to provide patient education about temporarily discontinuing 'at-risk' medicines during acute dehydrating illnesses.

Table 2 shows Likert scale responses to statements about their current practices regarding patient pre-emptive temporary 'at-risk' medicine discontinuation education. Most GP respondents (28/34) provided this education 'sometimes' when prescribing ACEi or ARBs ($n = 27$), NSAIDs or diuretics, and other medicines ($n = 20$), whereas pharmacists never ($n = 14$), sometimes ($n = 12$) or always ($n = 5$) provided it. In comments analysed qualitatively, both groups reported the need for additional knowledge, the importance of a collaborative approach, a challenging community pharmacy business model, time constraints, concerns about patient medicine literacy, a lack of printed resources and compliance packaging limitations (Table 3).

Community pharmacists' current workplace practices when NSAID sales are being made are reported in Table 4. Most responding pharmacists had the perception that non-pharmacist staff were unlikely to ask customers purchasing a NSAID about concurrent medicines, acknowledging that if purchasers indicated taking other medicines, referral to a pharmacist would occur. Pharmacist respondents' general approach to the sale of NSAIDs was to provide advice, counselling on NSAID-associated

Table 1. Demographic characteristics of respondents

Characteristic	General practitioners *N* = 37 *n* (%)	Community pharmacists *N* = 32 *n* (%)
Gender		
Males	19 (51)	9 (28)
Females	17 (46)	16 (50)
Missing	1 (3)	7 (22)
Age (years)		
≤30	1 (3)	2 (6)
31 – 40	6 (16)	3 (9)
41 – 50	9 (24)	7 (22)
51 – 60	16 (43)	11 (34)
>60	4 (11)	2 (6)
Missing	1 (3)	7 (22)
Number of years working as clinician		
≤5	6 (16)	0
6 – 10	2 (5)	3 (9)
11 – 20	10 (27)	3 (9)
21 – 30	12 (32)	8 (25)
>30	6 (16)	11 (34)
Missing	1 (3)	7 (22)
Employment		
Employer	21 (57)	10 (31)
Employee	12 (32)	15 (47)
Locum	3 (8)	0
Missing	1 (3)	7 (22)
Qualifications*		
Degree (%)	17 (46)	20 (63)
Postgraduate qualification	14 (38)	3 (9)
Fellow of Royal New Zealand College of General Practitioners	28 (76)	N/A
Working towards Fellow of RNZCGP	6 (16)	N/A
Working towards postgraduate qualification	N/A	3 (9)
Missing	1 (3)	7 (22)
Undergraduate provider		
University of Otago	9 (24)	5 (16)
University of Auckland	8 (22)	0
Overseas	17 (46)	4 (13)
Central Institute of Technology	N/A	15 (47)
Missing	3 (8)	8 (25)

* Percentage totalled over 100 as multiple options were able to be selected.
N/A (not asked); RNZCGP (Royal New Zealand College of General Practitioners).

Table 2. Educating patients to temporarily withhold medicines to reduce risk of acute kidney injury

Responder type and question	Response			
General practitioners ($N = 37$)				
How often recommendations made to temporarily withhold taking medicines during periods of acute illness with an increased risk of dehydration.	Always *n* (%)	Sometimes *n* (%)	Never *n* (%)	No answer *n* (%)
ACEi or ARB	4 (11)	27 (73)	6 (16)	0
NSAID or diuretic	3 (8)	28 (76)	5 (14)	1 (3)
Other medicines	4 (11)	20 (54)	13 (35)	0
Level of agreement that community pharmacists have the knowledge and skills to discuss the topic of medicine use during an acute illness with an increased risk of dehydration with patients	Yes *n* (%)	No *n* (%)	Unsure *n* (%)	No answer *n* (%)
	29 (78)	0	6 (16)	2 (5)
Level of support for pharmacists educating patients prescribed either an ACEi or an ARB to temporarily withhold taking them during periods of acute illness with an increased risk of dehydration	Yes *n* (%)	No *n* (%)	Unsure *n* (%)	No answer *n* (%)
	24 (65)	3 (8)	9 (24)	1 (3)
Pharmacists ($N = 32$)				
How often patient education is provided about which medicines to temporarily withhold during an acute illness which has an increased risk of dehydration	Always *n* (%)	Sometimes *n* (%)	Never *n* (%)	No answer *n* (%)
	5 (16)	12 (38)	14 (44)	1 (3)
Willingness to advise all patients taking either an ACEi or an ARB, to temporarily withhold them when they suffer an acute illness which has an increased risk of dehydration	Yes *n* (%)	No *n* (%)		No answer *n* (%)
	23 (72)	7 (22)		2 (6)

ACEi (angiotensin-converting enzyme inhibitor); ARB (angiotensin-II receptor blocker); NSAID (non-steroidal anti-inflammatory drug).

risks and recommending an alternative if appropriate.

Pharmacists educating patients to temporarily withhold 'at-risk' medicines during acute dehydrating illnesses

Twenty-nine GP respondents considered that community pharmacists were capable of educating patients; 24 supported pharmacists advising patients prescribed an ACEi or ARB to temporarily withhold it during acute illnesses. GP perceptions around practicalities of pharmacists providing this education included: not all had the skills; the community pharmacy business model limitation; and pharmacists' lack of time.

Twenty-three pharmacists would be prepared to provide this patient education (Table 2). Barriers indicated by pharmacists include: challenges of speaking directly with prescribers in a timely manner; lack of current GP–pharmacist collaboration on this topic; concerns about patient health literacy; and lack of time and remuneration (Table 3).

'At-risk' medicine and AKI risk management: *Double* and *Triple Whammy*

Current practices regarding patient advice provided for self-medicated NSAID when co-prescribed with ACEi, ARB and diuretic medicines are shown in Table 5. Similar responses were found for GPs and pharmacists regarding providing no patient advice ($n = 3$ and 2, respectively); advising not to use NSAIDs at all ($n = 7$ and 5, respectively); and modifying advice depending on a patient's age ($n = 17$ and 10, respectively). Thirteen pharmacist respondents indicated patients may collect dispensed medicines without speaking to a pharmacist; in these cases, no advice would be provided about NSAID self-medication that would cause a *Triple Whammy* combination.

Table 3. Categories from free-text comments related to challenges or barriers to providing patient education on temporarily withholding medicines during acute dehydrating illness

Categories		Representative GP quotes	Representative Pharmacist quotes
Professional Barriers	Additional knowledge and best practice confirmation	'I would like to know more about how unwell the patient needs to be before I need to consider with-holding medications.' [GP 11]	'Not unless it is regarded as best practice and prescribers also regard this as best practice.' [Pharmacist 21]
	Collaborative approach	'I would probably want to be involved in that discussion, or at least be informed that the above advice had been given.' [GP 11]	'Although when advising on temporary discontinuation of medications this should be collaborative with the GP so they are aware of the situation.' [Pharmacist 18]
	Pharmacy business and remuneration model	'Community Pharmacists are probably totally bedraggled by running a business, and may not have time for these finer points.' [GP 1]	'Not if this is a free service unpaid for by DHB.' [Pharmacist 30]
	Pharmacist professional vs. business conflict	'Yes they have the knowledge and skills but current business models probably work against this.' [GP 28]	'Our pharmacy doesn't encourage this - personally I want to inform patients about this but am discouraged by upper management.' [Pharmacist 11]
Operational Barriers	Patient medicine literacy	'Discontinuing medication temporarily requires a high level of understanding from patients.' [GP32]	'This is really tough as the level of health literacy in order to carry out this seemingly simple instruction is very low. I feel that patients would stop the wrong one, not know under what circumstances to stop the medication, never recommence after stopping....' [Pharmacist 1]
	Printed information resource	'…only a limited amount of information is retained by patient- we need to be conscious of overloading patients with too much information at once. Some printed info to go with standard scripts warning of triple whammy risks - preferably from pharmacist routinely but also from GP surgery.' [GP 34]	'As long as this stance is backed by reference material, we can supply the patient and their prescriber.' [Pharmacist 8]
	Time pressures	'Time to read about it, get short advice, time to discuss this with the patient.' [GP 6]	'We try to give this advice out at the dispensing time, but not always do we have time to do so.' [Pharmacist 23]
	Limited clinician–patient contact during acute dehydrating illnesses	'...if I know about the acute illness, but often the patient does not present with what they see as a relatively trivial illness… I think that most community pharmacists have the skills to have this conversation but again, the patient may not present - or it may be a friend or family member on their behalf.' [GP 4]	'Hard to know when patients have acute illness if we only see them [every] 3 monthly with STAT dispensing.' [Pharmacist 32]
	Adherence packaging	'…. First: It is very difficult for myself and patients with our patients with multiple medications in blister packs to even know which coloured pill is what !!!…' [GP 32]	'…. meds are blister packed, patients don't know which med is which. VERY difficult.' [Pharmacist 1]

DHB (District Health Board).

Current pharmacist actions taken and GP views on pharmacist actions when a *Double* or *Triple Whammy* combination occurs due to a NSAID being prescribed when ACEi, ARB and diuretic medicines are concurrently prescribed are shown in Table 6. No GP respondents expected pharmacists to dispense a NSAID prescription, resulting in either a *Double* or *Triple Whammy* combination, and not provide patient advice. However, one GP was unsure whether patients would accept the pharmacist's advice. Approximately half of the GP respondents expected pharmacists to provide patient education about temporarily withholding NSAIDs, ACEis, or ARBs during acute illnesses;

Table 4. Supply of NSAIDs in community pharmacies

Question	Responses (*N* = 32)			
In my workplace, a customer purchasing an NSAID would be asked about other medicines they were taking if the sale was processed by a:	Yes *n* (%)	No *n* (%)	Do not know *n* (%)	Missing data *n* (%)
Retail staff member	11 (34)	5 (16)	5 (16)	11 (34)
Pharmacy or dispensary technician[#]	16 (50)	3 (9)	3 (9)	10 (31)
Pharmacist	23 (72)	0	0	9 (28)
If a customer purchasing a NSAID as an OTC sale was asked about other medicines and replied that s/he was also taking an ACEi or ARB and a diuretic, the following would usually occur, depending on which staff member was the first point of contact.		Retail staff member *n* (%)	Technician *n* (%)	Pharmacist† *n* (%)
Refer to pharmacist		18 (56)	19 (59)	N/A
Make sale		2 (6)	2 (6)	N/A
Decline sale (often offer an alternative indicated)				10 (31)
Refer to GP				4 (13)
Provide advice or counselling about risks				6 (19)
Further questioning to determine appropriateness				2 (6)
Discouraged by management				1 (3)
Check if NSAID previously prescribed in dispensing records				1 (3)
Missing data		12 (38)	11(34)	9 (28)

When selling diclofenac (Pharmacist-only NSAID)*	I never specifically check to see if taking ACEi, ARB, or diuretic *n* (%)	If a *Double Whammy* combination with NSAID		If a *Triple Whammy* combination with NSAID		Not answered
		Decline sale *n* (%)	Sell and discuss risks *n* (%)	Decline sale *n* (%)	Sell and discuss risks *n* (%)	
	1 (3)	8 (25)	10 (31)	17 (53)	6 (19)	9 (28)

How often does the potential for a patient to respond negatively, if you were to decline the sale of a NSAID, influence the education you provide to patients about the safe use of NSAIDs?	Never	Rarely	Sometimes	Frequently	Not answered
	9 (28)	8 (25)	3 (9)	1 (3)	11 (34)

[#]Technicians work in the dispensary of a community pharmacy and have specific qualifications.
†One provided multiple actions (e.g. advice and/or referral to GP).
*Multiple options were able to be selected.
ACEi (angiotensin-converting enzyme inhibitor); ARB (angiotensin-II receptor blocker); NSAID (non-steroidal anti-inflammatory drug); GP (general practitioner); N/A (not asked); OTC, over-the-counter.

however, less than one-quarter of pharmacists indicated that they provided this education with prescriptions.

Twenty GP respondents expected pharmacists to contact them before dispensing a prescription that resulted in a *Triple Whammy* combination. One GP noted the increased importance if the NSAID was not prescribed by the GP, whereas another considered communication was only necessary if the pharmacist had a specific individual concern. Eleven pharmacist respondents would contact the prescriber prior to dispensing a *Triple Whammy* combination (Table 6). Barriers to pharmacists contacting prescribers if concerned about a prescribed *Triple Whammy* combination are shown in Table 7. Barriers reported reflected uncertainties around GP expectations and their acceptance of pharmacist communication; patient considerations; and operational barriers including time, inability to discuss prescriptions with prescribers in a timely manner, and insecurities about pharmacists' professional roles.

Table 5. General practitioner and pharmacist advice provided to patients about NSAID self-medication, which would cause a Triple Whammy *combination*

Question	Response	
The advice provided about self-medicating with an NSAID, including those purchases in a supermarket or service station when writing or dispensing a prescription for either an ACE inhibitor (or ARB), AND a diuretic	GPs *N* = 37 *n* (%*)	Pharmacists *N* = 32 *n* (%*)
I do not provide advice about NSAID use	3 (8)	2 (6)
I have never considered the risk of NSAID use, so have not provided specific guidance	2 (5)	3 (9)
I advise patients NOT to take NSAIDs	7 (19)	5 (16)
My advice changes depending on the age of the patient	17 (46)	10 (31)
My advice changes depending on the renal function of the patient	21 (57)	N/A
I advise patients NOT to take NSAIDs during periods of acute illness or dehydration	14 (38)	N/A
I do not provide advice when I have not initiated the sale of a NSAID	N/A	10 (31)
I advise patients to check with his/her prescriber regarding the use of NSAIDs	N/A	10 (31)
The patient may collect the dispensed prescription and not speak with a pharmacist, therefore no advice is provided	N/A	13 (41)
I do not provide advice when the patient is unwilling to engage	N/A	4 (13)
Other:	6 (16)	9 (28)
• Not paid to provide this level of service		3 (9)
• Insufficient time		2 (6)
Missing data	1 (3)	9 (28)

*Percentage totalled over 100 as multiple options were able to be selected.
ACEi (angiotensin-converting enzyme inhibitor); ARB (angiotensin-II receptor blocker); NSAID (non-steroidal anti-inflammatory drug); NSAID (non-steroidal anti-inflammatory drug); GP (general practitioner); N/A (not asked).

Discussion

Although our study respondents consider they have the skills and knowledge to educate people about temporarily withholding 'at-risk' medicines during acute dehydrating illnesses, it is not a routine practice for either professional group. There is general support for community pharmacists providing patient education, but both groups identified challenges to operationalisation. Education about safe NSAID self-medication, particularly for patients at risk of AKI when concurrent medicines lead to either a *Double* or *Triple Whammy* combination, is varied, along with GP misperceptions about the extent of patient education provided by pharmacists during the dispensing process.

We found that some GPs never provide pre-emptive temporary 'at-risk' medicine discontinuation education and most provide it 'sometimes'. This may reflect New Zealand's focus to stop 'at-risk' medicines when AKI has been established and raise awareness of risks associated with the *Triple Whammy* combination, together with the weak evidence reported for reducing net harm, limited evidence within primary care, and potential risks of this approach.[13,14,21,22] How New Zealand clinicians implement the guidance to stop 'at-risk' medicines if AKI develops is a potential area for future research.

The barriers we found to providing pre-emptive temporary 'at-risk' medicine discontinuation education identified in our study are consistent with international research.[23,24] The need for an agreed patient message and professional collective engagement between general practice and community pharmacy noted in our findings are reflected in international studies, which also recommend collaboration with secondary care and training of other providers such as carers and nursing staff.[24] A parallel barrier is resourcing; incorporating this patient education into existing services and incentive structures suggested in international studies may

Table 6. General practitioners' expectations of pharmacists and pharmacist actions taken when a Double *or* Triple Whammy *combination occurs due to a NSAID being prescribed when ACEi, ARB or diuretic medicines are concurrently prescribed*

Action reported	Clinical situation			
	NSAID added to an ACEi/ARB, or a diuretic i.e. *Double Whammy*		NSAID added to an ACEi/ARB and a diuretic i.e. *Triple Whammy*	
	GPs expect the dispensing community pharmacist to (*N* = 37) *n* (%*)	Community pharmacist would: (*N* = 32) *n* (%*)	GPs expect the dispensing community pharmacist to (*N* = 37) *n* (%*)	Community pharmacist would: (*N* = 32) *n* (%*)
Dispense and provide no patient education	0 (0)	2 (6)	0 (0)	2 (6)
Discuss with the patient before dispensing	N/A	9 (28)	N/A	9 (28)
Contact prescriber to highlight the *Double* or *Triple Whammy* combination before dispensing the prescription	11 (30)	2 (6)	20 (54)	11 (34)
Dispense and when patient collects medicine determine what education the prescriber provided with respect to what they should do when they become acutely unwell	17 (46)	15 (47)	15 (41)	14 (44)
Dispense and advise the patient not to take the NSAID during acute illness, or if dehydrated	19 (51)	7 (22)	13 (35)	9 (28)
Dispense and advise patient to ask at their next appointment for guidance on what to do should she/he become acutely unwell (vomiting, diarrhoea, dehydration due to a fever) or dehydrated	10 (27)	2 (6)	9 (24)	3 (9)
Dispense and advise patient not to take the NSAID and ACEi (or ARB) during acute illness, or if dehydrated	20 (54)	N/A	15 (41)	N/A
Dispense and contact practice nurse to highlight combination in the patient notes suggesting a future review of this combination	N/A	0 (0)	N/A	8 (25)
Action would depend on how much time I had	N/A	10 (31)	N/A	2 (6)
Action would depend on customer	N/A	6 (19)	N/A	7 (22)
Action would vary depending on dispensing history	N/A	10 (31)	N/A	8 (25)
Not answered	1 (3)	8 (25)	1 (3)	9 (28)

*Percentage totalled over 100 as multiple options were able to be selected.
ACEi (angiotensin-converting enzyme inhibitor); ARB (angiotensin-II receptor blocker); NSAID (non-steroidal anti-inflammatory drug); GP (general practitioner); N/A (not asked).

Table 7. Community pharmacist barriers to contacting prescribers if concerned about a prescribed Triple Whammy *combination*

Selected barriers	Frequency ($N = 32$) *n* (%*)
I am unsure if prescribers take this interaction seriously	21 (66)
I am unsure if prescribers want pharmacists to contact / remind them when they prescribe a *Triple Whammy* combination	18 (56)
Not known if the patient has already had this discussion	15 (47)
I am unsure if prescribers are monitoring renal function to know when to change long-term medicine regimens	15 (47)
Mistrust - especially when advice varies to that given to the patient by other health providers	11 (34)
Time barrier for pharmacist to ring prescriber when *Triple Whammy* prescribed	11 (34)
I am unsure if prescribers want pharmacists to contact them	10 (31)
I am unsure if I need to discuss the risk of AKI with every patient on an ACEi, ARB, diuretic, NSAID or Cox-2 inhibitor	10 (31)
Time taken for pharmacist to educate patient	9 (28)
Time / distance for patient to return to the prescriber if this is deemed necessary after pharmacist/prescriber discussion	8 (25)
Patient health / medicine literacy - complicated discussion, which is too much for some	7 (22)
Consistency of advice - difficult updating patient on new information	5 (16)
Not suitable for all patients, all of the time	4 (13)
I do not face barriers when contacting prescribers about this combination	2 (6)
I do not contact prescribers about this combination	2 (6)
Free-text categories and analysis:	
Difficulty talking directly with the prescriber	5 (16)
Difficulty to engage prescriber in conversation Prescriber doesn't believe short-term NSAIDs pose a risk	1 (3) 1 (3)
Patient happy to take combination knowing risks	1 (3)
Further pharmacist education required	1 (3)
Missing data	8 (25)

*Percentage totalled over 100 as multiple options were able to be selected.
AKI (acute kidney injury); ACEi (angiotensin-converting enzyme inhibitor); ARB (angiotensin-II receptor blocker); NSAID (non-steroidal anti-inflammatory drug); COX-2 (cyclooxygenase-2 inhibitors).

need to be considered in New Zealand to support sustainability.[23,24]

Our findings of GPs' support for pharmacists' advisory roles is reflected in previous research, which found that GPs are generally supportive of the pharmacist's role in new medicine review services.[25–27] Although more accepting of pharmacists' dispensing roles, acceptance has also grown for their medicine management services.[25–27] In New Zealand, GPs have been reported to value pharmacists highlighting potential interactions and safety issues and support pharmacists having a greater role in providing medicine education to patients; pharmacists also report a keen awareness of GP sensitivities.[28]

A limitation of our study is that regular promotion of the survey over a long period of time may have drawn attention to the topic and influenced practice. Data were collected for this study in 2015 and 2016; practices may have changed between data collection and publication. Our study did not survey practice nurses who play a significant role in patient care and education in general practice, so their contribution to current practice is missing. We asked pharmacists about their staff's actions; responses reflect pharmacists' perceptions rather than actual staff actions. There was a low response rate from both groups and not all respondents answered all questions, resulting in the potential for non-responder and non-response bias limiting generalisability.

Our study highlights the expectations that GPs may have about current pre-emptive temporary 'at-risk' medicine discontinuation education provided by

community pharmacists as part of the dispensing service, which is unlikely to occur routinely. Our study also reveals an interprofessional misunderstanding where GPs welcome pharmacists highlighting patients taking a *Triple Whammy* combination to them prior to dispensing the prescription, whereas community pharmacists believe this level of intervention could be unwelcome.

Some NSAIDs are classified as General Sale medicines, enabling public purchase without health professional education. Evidence suggests that the public have little knowledge about safe use of NSAIDs when purchased over-the-counter.[29] Professional advice is a key point of difference for pharmacy. Overseas, campaigns promoting pharmacists as educators about the safe use of NSAIDs have increased pharmacist and public knowledge.[30,31] Our study suggests that not all pharmacy businesses ensure customers receive key medicine information from well-trained staff; such campaigns may be of value in New Zealand.

This study suggests there is GP support for community pharmacists to provide patient education about pre-emptive temporary 'at-risk' medicine discontinuation during acute dehydrating illnesses, but barriers reported by both GPs and pharmacists will need consideration. New community pharmacy services are recommended to be developed and piloted in collaboration with primary and secondary care.[24,25] Could the Integrated Health Care Framework, developed by The Pharmaceutical Society of New Zealand and the New Zealand Medical Association, be used to develop a collaborative approach for the provision of this patient education?[32] The Royal Pharmaceutical Society of Great Britain has endorsed pharmacists providing pre-emptive temporary 'at-risk' medicine discontinuation patient education as an AKI harm-reduction strategy, supported by continuing education.[6,30] Neither the New Zealand Pharmaceutical Society nor the Pharmacy Council of New Zealand have position statements on pharmacists' roles in AKI management.

There is a role for both medical and pharmacist professional groups to strengthen prescriber–pharmacist relationships at both governance and operational levels. Although the Pharmacy Council and Nursing Council have the joint statement *'Roles and Responsibilities of Pharmacists and Nurses'*, there is no Pharmacy Council joint statement with the Medical Council.[33] There has been much investment in patient portal and health pathway technology; is there now value in focusing on clinical portals for sharing information between general practice and community pharmacy, as well as secondary care?[34,35] If health pathways and clinical portals are enablers for providing this patient education, these may be valuable to implement in Hawke's Bay.

Concerns were raised about message complexity and patient health literacy. Therefore, a patient information resource to facilitate consistent messaging by multiple health providers is recommended.[23,24] In New Zealand, Health Navigator and Kidney Health NZ provide AKI information, but this is not contextualised for New Zealand.[36,37] There may be value in culturally appropriate resources being developed for the New Zealand population.

Conclusion

Study respondents were confident in their capability to provide pre-emptive temporary 'at-risk' medicine discontinuation education to reduce the risk of community-acquired AKI. GP respondents had confidence in pharmacists providing this education and pharmacist respondents were willing to provide it if additional training, prescriber support, and specific remuneration were provided.

Both GPs and community pharmacists have different expectations regarding the level of patient education provided by pharmacists as part of the dispensing function and the pharmacist interventions occurring when a *Triple Whammy* combination is prescribed. Collaborative planning between Hawke's Bay health-care clinicians would be beneficial to clarify professional roles and develop consistent patient education regarding the 'at-risk' medicines to temporarily withhold during acute dehydrating illnesses, thus ensuring provision in a coordinated manner.

Ethics

The Health and Disability Ethics Committee's scope of review determined that national ethical

approval was not required for this research; registration with the Research Office at Hawke's Bay District Health Board occurred.

Competing Interests

Dianne Vicary currently works for Hawke's Bay District Health Board as a Portfolio Manager. On behalf of other authors, the corresponding author states that there are no competing interests.

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