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Publisher citation:

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Research in Social and Administrative Pharmacy, 2017

The behaviors and experiences of the community pharmacy team on the provision of multi-compartment compliance aids

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Abstract

Background

Multi-compartment compliance aids (MCAs) are repackaging systems for solid dosage form medicines. Acknowledging the lack of evidence that MCAs improve adherence or clinical outcomes, the Royal Pharmaceutical Society has expressed concern that MCAs have 'become regarded as a panacea for medicines use'.

Objectives

To determine the behaviors and experiences of the community pharmacy team around MCA provision.

Methods

A cross-sectional survey was conducted in 26 community pharmacies in the north east of Scotland. Survey items were grouped into: current activities in the provision of MCAs; potential influences on these activities; reports of patient experiences; and demographics. Data were analysed using descriptive and inferential statistics, and content analysis of responses to open questions. Principal component analysis (PCA) was performed on the items of potential influences on activities.

Results

Data were collected from 136 community team members (median 4, range 1-10 per pharmacy; 32.3% pharmacists). All were involved in some aspect of MCA provision and within the same pharmacy, several different staff positions were commonly involved in the same activity. PCA gave seven components; the lowest scores were obtained for the component of 'others expecting me to provide MCAs'. Participants agreed that GPs, patients and their families, and carers expected them to provide MCAs. Positive experiences of MCA provision were in themes of promoting patient adherence, reducing patient stress and enhancing patient monitoring. Further negative experiences were in of lack of shared patient decision making, worsening adherence and generation of medicines waste, and dealing with changing medicines. MCAs were not always considered to be the most appropriate solution.

Conclusion

While community pharmacy teams value MCAs, there may be issues around staff assignment to particular roles, expectations from others and reports of negative patient experiences. A systematic approach to MCA provision and monitoring involving the multidisciplinary health and social care team is warranted.

Key words

Multi-compartment compliance aids; adherence; expectations; medicines; survey; Scotland

Introduction

Multi-compartment compliance aids (MCAs) are repackaging systems for solid dosage form medicines, such as tablets and capsules, where the medicines are removed from manufacturer's original packaging and repackaged into the MCA.¹ While these are advocated widely as a solution to non-adherence, the Royal Pharmaceutical Society of Great Britain, the professional leadership body, states that pharmacy supplied MCAs have 'become regarded as a panacea for medicines use and often integrated into practice and service policy without giving due consideration to the alternatives'.¹

Despite their use, there is a dearth of evidence that MCAs improve medicines adherence. A systematic review of the effectiveness of reminder packaging for improving medicines adherence was reported by Mahtani *et al.* in 2011. Of the 12 randomised controlled trials comparing MCAs to no device, findings demonstrated scant evidence of impact on medicines adherence or any clinical outcomes studied.² A further systematic review reported by Watson *et al.* in 2016 on the evidence for the efficacy, safety and costs relating to MCA use derived from 17 studies also concluded that the evidence was limited.³ In addition, they noted that studies were generally of poor quality and at high risk of bias. Both systematic reviews highlighted the difficulties of obtaining valid and reliable measures of adherence in those using MCAs. MCA use in older people has also been associated with lower patient knowledge of their medicines, an effect thought due to patients not recognising the different medicines within the MCA.⁴

Qualitative studies have also highlighted concerns over MCA use. Nunney *et al.* conducted qualitative interviews with older people living independently in England and an unrelated sample of health professionals involved in MCA provision.⁵ Older people had mixed views on whether MCAs helped or hindered in maintaining independence and control over medicines. None of the older people reported that the MCA had aided adherence. Health professionals voiced that MCAs were often initiated without any systematic patient assessment. More recently, MacLure *et al.* reported a case study methodology of older residents of very sheltered housing in the north east of Scotland. Data were gathered from multiple perspectives of residents, carers and health professionals. While MCAs were valued by some, particularly the potential to improve medicines adherence, patient safety and independent living, the overwhelming finding was the absence of a clearly defined, effective and efficient approach to MCA provision and review.⁶

Several studies have also demonstrated that MCA use could perpetuate potentially inappropriate prescribing, which is perhaps due to the lack of clinical review of prescribed medicines prior to commencing the MCA. Two pharmacoepidemiology studies based on data derived from prescribing databases in Sweden demonstrated that MCA

use was associated with increased potentially inappropriate prescribing and potentially clinically significant drug-drug interactions.^{7,8} Further Swedish data were reported by Belfrage *et al.* in a comparison of medicines related issues observed in 100 MCA patients to those in 100 non-MCA patients. Findings highlighted that MCA patients had a mean of an additional 0.77 potentially inappropriate medicines.⁹ More recently, Counter *et al.* provided further evidence that MCAs perpetuate potentially inappropriate prescribing. Data were collected from pharmacies in the north east of Scotland supplying up to 136 MCAs per week to 2060 non-care home residents. A total of 1977 potentially inappropriate medicines were identified affecting 58% of patients, a quarter of whom were prescribed ten or more medicines and just under half had potentially clinically significant drug-drug interactions.¹⁰

There are other related issues which may compromise patient safety through the use of MCAs. The preparation of MCAs requires that medicines are removed from their original packaging and placed either manually or automatically into the individual compartments of the MCA, increasing the opportunity for error.¹¹ Carruthers *et al.* audited MCA dispensing in Australia, reporting errors prevalent in 4.3% of MCAs, the most common being omitted medicines, supply of ceased medicines, wrong strength dispensed or incorrect dosage instructions.¹²

It is therefore evident that there is a need to review the patient care pathway leading to the provision and review of MCAs. Prior to developing such a pathway, the perspectives of those involved in any aspect of MCA provision should be described and understood. While studies have reported the perspectives of patients, health professionals and formal carers, the voices of the entire community pharmacy team are yet to be heard. The aim of the study was to determine the behaviors and experiences of the community pharmacy team around MCA provision.

Methods

Design

This study was a cross-sectional survey using a researcher administered data collection tool.

Setting

The study took place within community pharmacies in one city in the north east of Scotland.

Recruitment

An email was sent to all pharmacies in the city (n=51) by a primary care lead pharmacist to raise awareness of the study and that during November and December 2015, researchers would be visiting pharmacies in Aberdeen to collect data from a convenience sample of available pharmacy staff. A participant information leaflet was attached to the email outlining: the purpose of the study; what was involved; likely benefits; and the confidentiality and anonymity of data. Potential participants were all members of the community pharmacy team who played a role on MCA provision. These were defined as pharmacists, pre-registration pharmacists, registered pharmacy technicians (accredited checking), registered pharmacy technicians, dispensing assistants, medicines counter assistants and delivery drivers. Prior to collecting data, the researchers confirmed that the information leaflet had been read and answered any questions. Participation in data collection was considered to be an indication of consent.

Data collection tool development and testing

A structured data collection tool was developed, and reviewed for face and content validity by pharmacist academics, and community and primary care pharmacists. Minor changes were made to the wording of several items.

Items were grouped into sections of: current activities in the provision of MCAs; potential influences on these activities; reports of patient experiences; and demographics. A structured list was used to capture each participant's involvement in various activities related to MCA provision (12 items, all answered yes, no) comprising: dispensing; completion of any documentation; assessment of patient suitability for MCA; clinical checking of MCA prescriptions; final accuracy checking of MCA dispensing; handing over of MCAs to patients or their representatives; delivery to patients' homes;

collection of obsolete MCAs; liaising with GP surgeries over ordering; liaising with GP surgeries over any queries; liaising with the patients or their representatives; and monitoring benefit of MCA provision to patients.

These items were then repeated in relation to who the pharmacy staff member believed should ideally fulfil that role.

Items related to influences on behavior (32 items), answered on 5-point Likert scales, were based on the 14 domains of the Theoretical Domains Framework (TDF). The TDF includes constructs from 33 behavior change theories, and proposes that determinants of behavior are clustered into 14 domains of: knowledge; skills; social/professional role and identity; beliefs about capabilities; optimism; beliefs about consequences; reinforcement; intentions; goals; memory, attention and decision processes; environmental context and resources; social influences; emotions; and behavioral regulation.¹³ The TDF Determinants of Implementation Behavior Questionnaire was used as a basis for the development of the individual items.¹⁴

Three free text response items were included to collect experiential data on: specific examples of patients (anonymised) who had derived benefits from having an MCA; examples of those where MCA provision had not been successful; and any other relevant comments.

Person and practice demographics (6 items, all closed questions) were: age; sex; position title; number of years in current position; personal life experience of MCAs (e.g. provided to family members or friends); and pharmacy type.

Prior to the study, the data collection processes and tool were piloted in one community pharmacy and as no major amendments were required, pilot data were included in the final study dataset.

Data collection

Data were collected in each pharmacy by trained final year undergraduate pharmacy students. Following confirmed willingness of the pharmacy team member to participate, the student read each item on the data collection tool and entered their responses. It was considered that this approach to recruitment and data collection was likely to achieve a higher participation rate than would be obtained via self-completion, as demonstrated by others.¹⁵ Anonymised data collection was undertaken in a private area of the pharmacy to avoid the participant being overheard.

Analysis

Data were entered into SPSS version 21.0, with a data entry reliability (all entries double checked) check performed on all entries, and analysed using descriptive and inferential statistics. The 5-point Likert scale items relating to TDF behavioral determinants were subjected to principal components analysis (PCA) – a statistical technique used to reduce a large number of items or variables to a smaller, more manageable number of components.¹⁶ Data suitability for PCA was tested via determination of the correlation matrix for co-efficients (≥ 0.3), the Kaiser-Meyer-Olkin measure of sampling adequacy (≥ 0.6) and Bartlett's test of sphericity (≤ 0.05). The number of components was determined via Eigenvalues > 1 and visual inspection of the scree plot. Oblique (Promax) rotation was used to aid the interpretation of the components as, from a theoretical perspective, there was reason to assume that selected attitudinal items were correlated; missing data were excluded pairwise.¹⁶ Where items cross loaded onto more than one component, the item was captured within the component of highest loading. Internal consistencies of the resulting component(s) were tested using Cronbach's alpha, aiming for > 0.60 as desirable for psychometric scales.¹⁷ Total component scores were obtained by assigning scores of 1 (strongly disagree) to 5 (strongly agree) to each of the Likert statement responses, with negatively worded items being reverse scored, and generating a summed score for each component. Differences in total scores between groups (position [pharmacist v non-pharmacist], years of experience [≤ 5 years v > 5 years], type of pharmacy [small independent, small multiple, large multiple], personal experience of MCA outwith work [yes v no]) in relation to component scores were tested using Mann-Whitney U test (2 groups) or Kruskal-Wallis (> 2 groups).

Responses to the open questions were analysed thematically using a content analysis approach.¹⁸ Coding was undertaken by two independent researchers, with a third consulted when non-consensus arose.

Ethics

This study was approved by the Ethical Review Panel of the School of Pharmacy and Life Sciences at Robert Gordon University, UK; the North of Scotland Research Ethics Committee advised that the study was exempt from NHS ethical review.

Results

Demographics

Staff at 26 of the 51 pharmacies visited took part, with staff at the remaining 25 declining due to either lack of time or staff shortages on the day. In the 26 pharmacies, 136 team members who were on duty at the time of the visit participated (median 4, range 1-10 per pharmacy). The participants' personal and practice demographics are provided in Table 1. Almost half worked in large multiple pharmacies (47.1%, 64), were pharmacists, pre-registration pharmacists or registered technicians (46.3%, 53), and were 30 years of age or under (44.9%, 61). The majority (88.2%, 120) were female, and two thirds (63.9%, 87) had been in their current position for five years or less. One quarter (25.0%, 34) had personal life experience of MCAs being provided to family members or friends.

<INSERT TABLE 1 HERE>

Current activities in the provision of MCAs

Participants' responses to the list of activities involved in the provision of MCAs are given in Table 2. While pharmacists were involved largely in clinical and dispensing accuracy checking and liaising with others, almost two thirds (59.1%, 26) were involved in dispensing. All community pharmacy team positions, other than the three delivery drivers, had involvement in most activities. Within the same pharmacy, several different staff positions were commonly involved in the same activity.

<INSERT TABLE 2 HERE>

Table 3 gives the participant responses to who they felt ideally should perform these specific activities. Almost all (91.2%, 124) viewed that dispensing should be the remit of dispensing assistants while pharmacists should focus on assessment of patient suitability for MCA (98.5%, 134), clinical and final accuracy checking and monitoring patient benefit (83.8%, 114).

<INSERT TABLE 3 HERE>

Given that the delivery drivers' involvement centred on delivery, their responses were excluded from further analysis.

Potential influences on these activities

When TDF determinants of behavior related items were subjected to PCA, the correlation matrix contained multiple coefficients above 0.3. The Kaiser–Meyer–Olkin measure of sampling adequacy (0.802) and Bartlett's test of sphericity (significance <0.001) confirmed the factorability of the items. Seven components had Eigenvalues exceeding 1.0, with the seven-component solution explaining 64.0% of the variance. These components all had high internal reliability; median, IQR and results of inferential analysis were as follows (see Table 4):

<INSERT TABLE 4 HERE>

i. Component 1, perceived knowledge of MCA related guidance and ease of application of guidance (7 items loaded, Cronbach's alpha 0.931)

The median total component score indicated overall neutral responses at a value of 19 (IQR 8-24.5) on a scale of 7-35 (midpoint 21), with 35 representing the most positive responses, i.e. the highest level of agreement around knowledge. Responses to individual items indicated that while respondents viewed themselves as knowledgeable about several key documents, they felt that they these less easy to apply in practice. Around one third were unsure or disagreed (29.2%, 33) that they knew enough about the stability of medicines in MCAs. Pharmacists scored statistically significantly higher for this component than non-pharmacists ($p < 0.001$).

ii. Component 2, beliefs of capabilities relating to competence and confidence in MCA activities, and training (5 items loaded, Cronbach's alpha 0.899)

The median total component score indicated overall positive responses at a value of 21 (IQR 19.5-24) on a scale of 5-25 (midpoint 15), with 25 representing the most positive responses i.e. the highest level of agreement with beliefs of consequences. There was overwhelming agreement with statements relating to competence, confidence, training and skills. Those working in small independent pharmacies scored statistically significantly higher for this component than those in other pharmacy types ($p = 0.003$).

- iii. *Component 3, issues of the appropriate working environment in terms of sufficient capacity, time, space, no undue stress or anxiety context (7 items loaded, Cronbach's alpha 0.772)*

The median total component score indicated overall neutral responses at a value of 21 (IQR 18-24) on a scale of 7-35 (midpoint 21), with 35 representing the most positive responses, i.e. the highest level of agreement of appropriateness. There were particular concerns over the impact of exceeding pharmacy capacity to supply MCAs (69.2% agreement, 92), space issues (46.6%, 62). Just under one half were distracted by other staff (42.7%, 56) and one third felt that they did not have enough time for MCA activities (31.1%, 40). Those working in small independent pharmacies scored statistically significantly higher for this component than those in other pharmacy types ($p < 0.001$) while pharmacists scored statistically significantly lower than non-pharmacists ($p = 0.014$).

- iv. *Component 4, others expecting me to provide MCAs (3 items loaded, Cronbach's alpha 0.603)*

The median total component score indicated overall negative responses at a value of 5 (IQR 4-6) on a scale of 3-15 (midpoint 9), with 15 representing the most positive responses, i.e. that there were high levels of expectation to provide MCAs. Almost all felt that there were expectations to supply MCAs from patients and their families (97.7%, 121 agreement), GPs (93.1%, 121) and carers (85.8%, 107). Those with more years of experience scored statistically significantly higher for this component than those with less experience ($p = 0.016$) as did those with personal experience of MCAs ($p = 0.003$).

- v. *Component 5, perceived knowledge of MCA patient assessment, decision to commence, and review (5 items loaded Cronbach's alpha 0.724)*

The Median total component score indicated overall neutral responses at a value of 14 (IQR 10-17.5) on a scale of 5-25 (midpoint 15), with 25 representing the most positive responses. i.e. the highest level of agreement around knowledge. There was a general lack of awareness on how patients were assessed prior to commencing an MCA (46.2%, 56 unsure or disagreeing), knowing enough to be able to assess patient need (54.0%, 61) or ability to use an MCA (53.6%, 60) or how patients were monitored (68.1%, 83). Pharmacists scored statistically significantly higher for this component than non-pharmacists ($p = 0.005$).

- vi. *Component 6, encouragement and incentives to provide MCAs (3 items loaded, Cronbach's alpha 0.779)*

The median total component score indicated overall neutral responses at a value of 9 (IQR 8-10) on a scale of 3-15 (midpoint 9), with 15 representing the most positive

responses i.e. a high level of agreement around encouragement and incentives. While respondents were encouraged to provide MCAs, there was marked disagreement that their employers provided any incentives (87.5%, 110 unsure, disagreed). Pharmacists scored statistically significantly higher for this component than non-pharmacists ($p=0.036$).

vii. Component 7, beliefs of consequences of MCAs leading to more effective and safer medicine use by patients (2 items loaded, Cronbach's alpha 0.90)

The median total component score indicated overall positive responses at a value of 8 (IQR 7-8) on a scale of 2-10 (midpoint 6), with 10 representing the most positive responses i.e. a high level of agreement around beliefs of consequences. Three quarters respondents agreed that MCAs led to more effective (78.9%, 105) or safer (73.5%, 98) medicines use by patients. There were no statistically significant differences for this component between demographic groups.

Reports of patient experiences

Content analysis of responses to the open item on examples of patients who had benefitted as a result of MCAs generated themes of promoting adherence, independence, reducing stress and the ability to monitor patient progress. For anonymised examples of patients where MCAs had been unsuccessful, the themes were the lack of shared decision making, poorer adherence, medicines waste, additional medicines supplied outwith the MCA, complexities of changing medicines and pressure from others. Other comments on MCAs generally were principally around MCAs not always being the most appropriate solution. Themes and illustrative quotes are detailed in Table 5.

<INSERT TABLE 5 HERE>

Discussion

One key finding of this study is that all community pharmacy team members were involved in some aspect of MCA provision and within the same pharmacy, several different staff positions were commonly involved in the same activity. There was similar diversity of opinion over the ideal staff member (or other) to perform specific MCA activities. PCA of the TDF determinants of behavior gave seven components of: perceived knowledge of MCA related guidance and ease of application of guidance; beliefs of capabilities relating to competence and confidence in MCA activities, and training; issues of the appropriate working environment in terms of sufficient capacity, time, space, no undue stress or anxiety; others expecting me to provide MCAs; perceived knowledge of MCA patient assessment, decision to commence, and review; encouragement and incentives to provide MCAs; and beliefs of consequences of MCAs leading to more effective and safer medicine use by patients.. The scores for others expecting me to provide MCAs were lowest, indicating that the participants agreed that GPs, patients and their families, and carers expected them to provide MCAs. In response to open questions, many positive experiences of MCA provision were cited, with themes of promoting patient adherence and independence, reducing patient stress and enhancing patient monitoring. There were, however, many negative experiences, with themes of the lack of shared patient decision making, worsening adherence and generation of medicines waste, the issue of dealing with changing medicines and pressure from others. MCAs were not always considered to be the most appropriate solution.

There are several strengths to this research. This is the first published study which has focused on the perspectives of the entire community pharmacy team. The items on influences on behavior were derived from psychological theory,^{13,14} increasing the likely construct and criterion validity.¹⁹ PCA analysis confirmed the factorability of the items, which clustered into seven components with high internal reliability. There are, however, several limitations to the study hence the findings should be interpreted with caution. Just under half of the pharmacies in the target area were unable to participate due to lack of time or staff shortages. While this may introduce a response bias, the participating community pharmacies were largely representative of all pharmacies in the area. Furthermore, the study was conducted in one city in the north east of Scotland hence the results may lack external validity. It is also possible that the findings may be skewed by those pharmacies with greater numbers of staff participants. However, it is likely that the key findings may resonate widely given the acknowledged global issues of polypharmacy, medicines non-adherence and the widespread use of MCAs.²⁰⁻²² While it is recommended for PCA that the ratio of responses to items is 5:1,¹⁶ we achieved a ratio

of 4.25:1 which may have reduced slightly the robustness of the analysis. In addition, the use of PCA rather than other factor analysis techniques such maximum likelihood exploratory factor analysis may have reduced the generalizability of the findings.

Community pharmacy provision of MCAs involved all members of the pharmacy team and while the responses will depend on the actual staff and numbers employed within each pharmacy (e.g. not all pharmacies will have pre-registration pharmacists or accredited checking technicians) and their perceived roles, there may be a lack of a systematic approach to staff allocation to specific tasks. Notably, within the same pharmacy, several different staff positions were commonly involved in the same activity. While the policy direction of the Scottish Government is encouraging pharmacists to assume more clinical roles,²³ almost two thirds of pharmacists were highly involved in MCA dispensing. Importantly less than one fifth of participants viewed that pharmacists were the ideal individuals to be dispensing MCAs, with this task being assigned to other members of the pharmacy workforce. The Scottish Government strategy, 'Prescription for Excellence, A Vision and Action Plan for the right pharmaceutical care through integrated partnerships and innovation',²³ published in 2013, articulates the strategic direction for pharmacy practice over the next decade. It outlines that pharmacists providing pharmaceutical care will be accredited clinical pharmacist independent prescribers working in partnership with the wider health and social care team. There is therefore opportunity to shift the pharmacist focus in MCA provision from dispensing to review of medicines. The need for clinical review of medicines was highlighted recently by Counter *et al.* who, in the same geographical setting, identified high prevalence of potentially inappropriate medicines in patients provided MCAs.¹⁰ The results from our study relating to task allocation and ideal task allocation indicate the need for a more systematic approach within the community pharmacy, which should also involve more clearly defined communication channels with the patient, other members of the health and social care team, carers and family members.

The results of the PCA analysis, with behavioral influences clustering into seven components, also highlight several key issues. The lowest scores were in relation to others expecting me to provide MCAs, with highlighting the expectations of GPs, patients and family members, and carers that pharmacies would provide MCAs. Interestingly, those participants who had personal life experience of MCAs and greater work experience were statistically significantly less likely to agree with these expectations. While expectation does not necessarily equate to any concern, pressure from others did emerge as a key theme in relation to challenges of providing MCAs. This issue was also highlighted by MacLure *et al.* who found that GPs in particular were unaware of capacity issues in community pharmacy.⁶

Scores for the components of perceived knowledge of MCA related guidance and ease of application of guidance, issues of the appropriate working environment in terms of sufficient capacity, time, space, no undue stress or anxiety, perceived knowledge of MCA patient assessment, decision to commence, and review and encouragement and incentives to provide MCAs were more neutral. For perceived knowledge, there were issues around the application of various guidance documents to practice hence the need for practitioner engagement at all stages of guidance development and implementation. There were also issues around medicines stability, which can lead to some medicines being supplied outwith the MCA, as shown in previous research.¹⁰ This adds to the complexities of medicines storage and medicines taking, with possible consequences of patient confusion and non-adherence. These consequences were also generated as themes around unsuccessful provision of MCAs. Other studies have also noted the potential for confusion and error when medicines are altered part way through the MCA cycle, with clear implications for patient care and safety.^{6,11,12}

While the scores for the component of issues the appropriate working environment in terms of sufficient capacity, time, space, no undue stress or anxiety were neutral, pharmacists tended to score lower than others, perhaps reflecting their supervisory and management focus. Participants voiced particular concerns over pharmacy capacity to supply MCAs, insufficient space for filling MCAs and workload distraction. This may have led to almost all participants stating that they prepared four weeks of MCA supplies at one time, which is contrary to the guidance of the RPS,¹ and may exacerbate complexities of medicines altering mid MCA cycle. These issues may lead to less safe working conditions which could compromise patient care and safety.

In terms of the component of perceived knowledge of MCA patient assessment, decision to commence, and review, there was less agreement around aspects such as knowing enough about the patient to conduct assessment of the need for and ability to use an MCA. Despite pharmacists scoring higher than other staff members, there is a clear lack of clarity around these processes. Similarly, pharmacists scored significantly higher for the component of encouragement and incentives to provide MCAs from their employers and the NHS but noted that there were no related incentives. Encouragingly, the scores for the component of beliefs of capabilities relating to competence and confidence in MCA activities, and training were generally high in terms of competence, confidence, training and skills, as were the scores for of MCAs leading to more effective and safer medicine use by patients. There was overwhelming agreement that MCAs could lead to more effective and safer medicines use.

The findings of this research are important for patient care and professional practice in any setting or country involved in MCA provision. Patient non-adherence to prescribed

medicines is an acknowledged global issue with non-adherence estimated to be prevalent in 47% to 100% of older people.²² Promoting adherence, fostering independence and reducing patient and carer stress were identified as key themes around participants' experiences of successful use of MCAs, as has been reported by others.⁴⁻⁶ However, non-adherence is known to be complex, multifactorial,^{22,24} and cannot easily be solved simply by provision of an MCA. Participants cited examples of the lack of patient involvement in the decision to commence an MCA and the potential impact of poorer adherence. The theme of MCAs not necessarily being the solution emerged strongly, highlighting the need for a well-defined patient pathway around all aspects of MCA provision. This should include the processes of: identification of individuals who may benefit from an MCA; review of the medicines; assessment of capability to use an MCA; issues relating to supply; and review of benefit. A feasibility and pilot study comparing the effectiveness and cost-effectiveness of MCAs compared to standard care has been reported recently. The authors concluded that a fully powered RCT is warranted,³ the results of which could inform a well-defined pathway.

Future research should focus on developing, implementing and evaluating an intervention around the pharmacy provision of MCAs encompassing all processes. Within community pharmacy, there is a clear need to define the roles and remit of different members of the team, how these relate to each other, the patient, other members of the health and social care team, family members and carers.

In conclusion, this research has identified that while community pharmacy teams value MCAs in terms of positive impact on effective and safe medicines use by patients, there are key issues around staff assignment to particular roles and how these relate to other roles and tasks. Notably, within the same pharmacy, several different staff positions were commonly involved in the same activity. Pharmacists were highly involved in MCA dispensing, with less involvement in more clinically focused activities. Participants viewed themselves as competent, confident and trained for their roles. There were key issues around GPs, patients and their families, and carers expecting community pharmacies to provide MCAs without due regard to capacity. There were also concerns around a lack of shared decision making, MCAs worsening medicines adherence, generating medicines waste, and the issue of dealing with changing medicines. MCAs were not always considered to be the most appropriate solution.

Funding sources

This work was supported by Robert Gordon University.

Acknowledgements

The authors wish to acknowledge the input to data collection of: Lauren Adams, Claire-Frances Boyle, Annmarie Cullinane, Julie McDonald, Nadia Mohammed, Karen Moore and Gaenor Morrison. We also acknowledge the support of all participating community pharmacy teams.

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Table 1 - Respondent personal and practice demographics (N=136)

Demographic	% (n)
Position	
Pharmacist	32.3 (44)
Pre-registration pharmacist	7.4 (10)
Registered technician (accredited checking)	3.7 (5)
Registered technician	2.9 (4)
Dispensing assistant	36.0 (49)
Medicines counter assistant	15.4 (21)
Delivery driver	2.2 (3)
Age (years)	
<20	5.9 (8)
21-30	39.0 (53)
31-40	16.9 (23)
41-50	17.6 (24)
51-60	14.7 (20)
>60	5.9 (8)
Sex	
Female	88.2 (120)
Male	11.8 (16)
Number of years in current position	
≤1	33.8 (46)
2-5	30.1 (41)
6-9	8.1 (11)
≥10	27.9 (38)
Personal life experience of MCAs (e.g. family, friends)	
Yes	25.0 (34)
No	75.0 (102)
Pharmacy type	
Small independent (1-4 pharmacies)	32.4 (44)
Small multiple (5-30)	20.6 (28)
Large Multiple (>30)	47.1 (64)

Table 2 – Percentage and number of participants who reported undertaking the activities listed related to the provision of MCAs,

Activities	Pharmacist (n=44) % (n)	Pre-registration pharmacist (n=10) % (n)	Registered technician (accredited checking) (n=5) % (n)	Registered technician (n=4) % (n)	Dispensing assistant (n=49) % (n)	Medicines counter assistant (n=21) % (n)	Delivery driver (n=3) % (n)
Dispensing	59.1 (26)	90.0 (9)	80.0 (4)	100.0 (4)	100.0 (49)	23.8 (5)	0
Completion of documentation	84.1 (37)	90.0 (9)	100.0 (5)	100.0 (4)	79.6 (39)	33.3 (7)	33.3 (1)
Assessment of patient suitability	75.0 (33)	80.0 (8)	80.0 (4)	50.0 (2)	18.4 (9)	4.8 (1)	0
Clinical checking of prescription	97.7 (43)	20.0 (2)	20.0 (1)	25.0 (1)	14.3 (7)	0	0
Final accuracy check of MCA	100.0 (44)	10.0 (1)	80.0 (4)	50.0 (2)	6.1 (3)	4.8 (1)	0
Handing to patients/ representatives	84.1 (37)	100.0 (10)	100.0 (5)	100.0 (4)	42.9 (21)	95.2 (20)	100.0 (3)
Delivery to patients' homes	15.9 (7)	40.0 (4)	20.0 (1)	25.0 (1)	34.7 (17)	42.9 (9)	100.0 (3)
Collection of obsolete MCAs	15.9 (7)	60.0 (6)	40.0 (2)	50.0 (2)	38.8 (19)	38.1 (8)	66.7 (2)
Liaising with GP surgery – ordering	86.4 (38)	80.0 (8)	100.0 (5)	100.0 (4)	85.7 (42)	9.5 (2)	33.3 (1)
Liaising with GP surgery – queries	97.7 (43)	80.0 (8)	100.0 (5)	100.0 (4)	95.9 (47)	9.5 (2)	33.3 (1)
Liaising with patients/ representatives	100.0 (44)	90.0 (9)	100.0 (5)	100.0 (4)	91.8 (45)	52.4 (11)	100.0 (3)
Monitoring benefit of MCA to patient	68.2 (30)	50.0 (5)	80.0 (4)	25.0 (1)	36.7 (18)	19.0 (4)	33.3 (1)

Table 3 – Percentage and number of participants reporting who ideally should perform specific activities relating to MCA provision (N=136; participants could name more than one hence totals may exceed 100%)

Activities	Pharmacist	Pre-registration pharmacist	Registered technician (accredited checking)	Registered technician	Dispensing assistant	Medicines counter assistant	Other
Dispensing	19.9 (27)	14.0 (19)	8.1 (11)	15.4 (21)	91.2 (124)	0.7 (1)	Family 0.7 (1)
Completion of documentation	55.1 (75)	22.1 (30)	16.2 (22)	14.7 (20)	81.6 (111)	1.5 (2)	0
Assessment of patient suitability	98.5 (134)	9.6 (13)	6.6 (9)	2.9 (4)	12.5 (17)	0	Doctor 24.3 (33) Nurse 13.2 (18) Social worker 9.6 (13) Carer 3.7 (5) Family 0.7 (1)
Clinical checking of prescription	100 (136)	4.4 (6)	4.4 (6)	2.9 (4)	8.1 (11)	1.5 (2)	Doctor 2.2 (3)
Final accuracy check of MCA	90.4 (123)	1.5 (2)	32.4 (44)	1.5 (2)	1 (0.7)	0	0
Handing to patients/representatives	79.4 (108)	24.3 (33)	21.3 (29)	21.3 (29)	83.8 (114)	72.1 (98)	Delivery driver 11.8 (16)
Delivery to patients' homes	3.7 (5)	0	0	0	11.0 (15)	14.7 (20)	Delivery driver 75.7 (103)
Collection of obsolete MCAs	12.5 (17)	4.4 (6)	2.2 (3)	5.9 (8)	20.6 (28)	11.8 (16)	Patient 5.9 (8) Carer 2.9 (4) Nurse 1.5 (2) Family 0.7 (1) Social worker 0.7 (1)
Liaising with GP surgery – ordering	65.4 (89)	20.6 (28)	17.6 (24)	13.2 (18)	78.7 (107)	4.4 (6)	Delivery driver 0.7 (1)
Liaising with GP surgery – queries	89.7 (122)	23.5 (32)	20.6 (28)	8.8 (12)	62.5 (85)	2.2 (3)	Delivery driver 0.7 (1)
Liaising with patients/representatives	91.1 (124)	26.5 (36)	20.6 (28)	13.2 (18)	67.6 (92)	24.3 (33)	Doctor 1.5 (2) Delivery driver 2.9 (4)
Monitoring benefit of MCA to patient	83.8 (114)	14.7 (20)	9.6 (13)	4.4 (6)	24.3 (33)	3.7 (5)	Doctor 18.4 (25) Nurse 8.1 (11) Social worker 6.6 (9) Delivery driver 4.4 (6) Carer 3.7 (5) Family 0.7 (1)

Table 4 - Participant responses to TDF behavioral determinant statements

Statement	Strongly agree = 5, % (n)	Agree = 4, % (n)	Unsure = 3, % (n)	Disagree = 2, % (n)	Strongly disagree = 1, % (n)
Component 1, perceived knowledge of MCA related guidance and ease of application of guidance					
Cronbach's alpha, 0.931					
Median total component score = 19 (IQR 8-24.5) on a scale of 7-35 (midpoint 21), with 35 representing the most positive responses.					
I know enough about the RPS professional guidance on the supply of MCAs (n=108)	8.3 (9)	47.2 (51)	11.1 (12)	27.8 (30)	5.6 (6)
I find the RPS professional guidance on the provision of MCAs easy to apply in practice (n=77)	2.6 (2)	51.9 (40)	37.7 (29)	7.6 (6)	0
I know enough about the United Kingdom Medicines Information (UKMi) Medicines Compliance Aid Database (n=105)	2.9 (3)	27.6 (29)	13.3 (14)	44.8 (47)	11.4 (12)
I find the UKMi guidance on medicine suitability easy to apply in practice (n=76)	3.9 (3)	50.0 (38)	34.2 (26)	11.8 (9)	0
I know enough about the Grampian Service Level Agreement on the supply of MCAs (n=106)	8.5 (9)	41.5 (44)	16.0 (17)	26.4 (28)	7.5 (8)
I find the Grampian Service Level Agreement on provision of MCAs easy to apply in practice (n=81)	3.7 (3)	45.7 (37)	29.6 (24)	18.5 (15)	2.5 (2)
I know enough about the stability of medicines in MCAs (n=113)	8.0 (9)	62.8 (71)	8.8 (10)	18.6 (21)	1.8 (2)
Component 2, beliefs of capabilities relating to competence and confidence in MCA activities, and training					
Cronbach's alpha, 0.889					
Median total component score = 21 (IQR 19.5-24) on a scale of 5-25 (midpoint 15), with 25 representing the most positive responses.					
I feel competent in my role with MCAs (n=133)	38.3 (51)	54.9 (73)	5.3 (7)	1.5 (2)	0
I feel confident in my role with MCAs (n=133)	37.6 (50)	53.4 (71)	6.8 (9)	2.3 (3)	0
I feel that I have the skills to do what I do in relation to MCAs (n=133)	38.3 (51)	57.1 (76)	3.6 (5)	0.8 (1)	0
I have been trained for my role in provision of MCAs (n=133)	28.6 (38)	51.1 (68)	10.5 (14)	9.8 (13)	0

In relation to provision of MCAs, we decided it was better use of our time to make up 4 weeks' supply of each MCA at once (n=129)	49.6 (64)	42.6 (55)	4.7 (6)	1.6 (2)	1.6 (2)
Component 3, issues of the appropriate working environment in terms of sufficient capacity, time, space, no undue stress or anxiety Cronbach's alpha, 0.772 Median total component score = 21 (IQR 18-24) on a scale of 7-35 (midpoint 21), with 35 representing the most positive responses. * items reverse scored					
*When dealing with MCAs, I feel stressed (n=133)	3.6 (5)	24.1 (32)	11.3 (15)	56.4 (75)	4.5 (6)
*I am concerned about the effect on my pharmacy team if we exceed our capacity to supply MCAs (n=133)	22.6 (30)	46.6 (62)	9.8 (13)	21.1 (28)	0
*In relation to provision of MCAs, I don't have enough time for my current role (n=129)	6.2 (8)	24.8 (32)	9.3 (12)	53.5 (69)	6.2 (8)
In relation to provision of MCAs, there are enough competent staff in the pharmacy (n=133)	16.5 (22)	57.1 (76)	6.8 (9)	18.0 (24)	1.5 (2)
*When dealing with MCAs, I feel anxious (n=133)	3.0 (4)	7.5 (10)	5.3 (7)	67.7 (90)	16.5 (22)
*In relation to provision of MCAs, other staff sometimes distract me when I am working (n=131)	12.2 (16)	30.5 (40)	8.4 (11)	42.3 (58)	4.6 (6)
*In relation to provision of MCAs, there is insufficient space in the pharmacy for our level of activity (n=133)	15.8 (21)	30.8 (41)	9.0 (12)	42.1 (56)	2.3 (3)
Component 4, others expecting me to provide MCAs Cronbach's alpha, 0.603 Median total component score = 5 (IQR 4-6) on a scale of 3-15 (midpoint 9), with 15 representing the most positive responses. * items reverse scored					
*GP practices expect me to provide MCAs (n=130)	36.9 (48)	56.2 (73)	6.2 (8)	0.8 (1)	0
*Patients and their families expect me to provide MCAs (n=129)	41.1 (53)	56.6 (73)	0.8 (1)	1.6 (2)	0
*Carers expect me to provide MCAs (n=127)	32.3 (41)	53.5 (68)	7.1 (9)	7.1 (9)	0
Component 5, perceived knowledge of MCA patient assessment, decision to commence, and review Cronbach's alpha, 0.724 Median total component score = 14 (IQR 10-17.5) on a scale of 5-25 (midpoint 15), with 25 representing the most positive responses. * items reverse scored					
I know enough about how patients on MCAs are monitored to see if they're helping (n=122)	6.6 (8)	33.6 (41)	20.5 (25)	36.1 (44)	11.5 (14)
I know enough about the patient to be able to assess their need for an MCA (n=113)	6.0 (8)	38.9 (44)	24.8 (28)	24.8 (28)	4.4 (5)
I know enough about the patient to be able to assess their ability to use an MCA (n=112)	4.5 (5)	42.0 (47)	27.7 (31)	23.2 (26)	2.7 (3)

I know enough about how patients are assessed prior to the decision to start and MCA (n=121)	11.6 (14)	42.1 (51)	15.7 (19)	26.4 (32)	4.1 (5)
*I sometimes find it difficult to decide whether a patient should get an MCA (n=93)	1.1 (1)	45.2 (42)	18.3 (17)	32.3 (30)	3.2 (3)
Component 6, encouragement and incentives to provide MCAs					
Cronbach's alpha, 0.779					
Median total component score = 9 (IQR 8-10) on a scale of 3-15 (midpoint 9), with 15 representing the most positive responses.					
My employer encourages me to provide MCAs (n=127)	22.0 (28)	44.9 (57)	20.5 (26)	11.0 (14)	1.6 (2)
My employer creates incentives for me to provide MCAs (n=126)	1.6 (2)	11.1 (14)	9.5 (12)	59.5 (75)	18.3 (23)
NHS Grampian encourages me to provide MCAs (n=122)	9.0 (11)	23.0 (28)	45.1 (55)	22.1 (27)	0.8 (1)
Component 7, beliefs of consequences of MCAs leading to more effective and safer medicine use by patients					
Cronbach's alpha, 0.90					
Median total component score = 8 (IQR 7-8) on a scale of 2-10 (midpoint 6), with 10 representing the most positive responses.					
I believe that MCAs lead to more effective medicine use by the patient (n=133)	15.0 (20)	63.9 (85)	18.8 (25)	2.3 (3)	0
I believe that MCAs lead to safer medicine use by the patient (n=133)	15.8 (21)	57.9 (77)	22.6 (30)	3.8 (5)	0

Table 5 – Themes and illustrative quotes comments relating to positive and negative examples of MCA use

Positive examples	
Themes	Illustrative quotes
Promoting adherence	<p>'Elderly polypharmacy patient who was on over ten medicines and was very confused therefore not complying with her medication. The use of an MCA meant her medicines were already organised for her so she took them correctly without hesitation.'</p> <p>'Epileptic patient with memory issues was uncontrolled on medication and had no structure to their medication regimen. Put on MCA and it helped greatly to control their illness, improved their quality of life.'</p> <p>'Lady who was uncertain of the doses she was to be taking and overdosed on zopiclone several times. MCA took this responsibility of remembering out of her hands.'</p>
Independence	'Patient whose daughter was the primary carer. Her daughter then moved away with her husband's work and lady was unable to manage medications herself. Pharmacy suggested MCA, she is now able to manage her medications independently.'
Reducing stress	'25 year old male. His mother cares for him and collects his medicines. She is often very stressed so by using the MCA it helps her by taking a lot of pressure off her.'
Ability to monitor patient progress	'Lady was running out of her medicines all the time. Decided to give her a weekly supply in an MCA. Pharmacy staff ensure that she brings back her MCA every week before she can get her next week's supply.'
Negative examples	
Themes	Illustrative quotes
Lack of shared decision making	<p>'GP requested an MCA without the patient's input. Patient wasn't happy, didn't feel like they needed MCA.'</p> <p>'Lady who refused to use it as she felt she had lost control over her own medication.'</p>
Poorer adherence	<p>'Elderly patient who is confused by how the MCA works therefore refuses to use it which has led to them being more confused as they are not taking any medication at all.'</p> <p>'Patient who gets medication delivered weekly would open up MCA and tip out all of the medication in the box, picked what she wanted and put it in a bowl.'</p>
Medicines waste	<p>'Lots of MCAs are returned to pharmacy untouched due to poor patient compliance.'</p> <p>'Patient's daughter complained that there were 20 Dosesettes piling up in her house unused and the pharmacy was still delivering them. Nobody had told the pharmacy that the patient wasn't using the medication.'</p>
Medicines supplied outwith the MCA	'Confusing when medicines are given alongside MCA. Patients on warfarin [outwith the MCA] are focusing on MCA instead of their warfarin.'
Complexities of changing medicines	'Medicines changed mid-cycle. If patients and carers are aware that it needs to be changed straight away, GP should involve pharmacy as patients could still be taking the wrong medication.'
Pressure from others	'GP surgery said a patient needed an MCA straight away. There was pressure on the pharmacy to supply him with an MCA. Patient had not been properly assessed and as a result took his medicines incorrectly.'
Comments on MCAs generally	
Theme	Illustrative comments

MCA's not always the solution

'Families, carers and social workers seem to think that MCA's are a magic answer. However, they are not the answer for everyone.'

'Doctors often think that an MCA is the solution to patients' problems, however, often more formal care is needed.'

'MCA's are only effective if they are for the right patient. So, 'Does the patient need it?' needs to be considered more. More initial follow-ups need to be carried out. More monitoring and assessment of patient ability to use an MCA needs to be thought about more often.'