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Describing the impact of community pharmacy organisation type on emergency hormonal contraception services in England

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Abstract

Objectives: In England, non-dispensing pharmacy services are commissioned either nationally or locally. For the national service Medicines Use Reviews (MURs), large multiple/chain pharmacies provide more consultations than independents. This study aimed to examine the relationship between community pharmacy organisation type and a local service, Emergency Hormonal Contraception (EHC). It also aimed to explore the influence of deprivation.

Methods: Freedom of information requests was sent to all 147 local authorities in England. Data included the number of EHC consultations by individual pharmacies across England (2017/18). Public data were used to identify pharmacies, match with MUR data, and group by organisation type. Bivariate correlations and ANOVA described the relationship between service provision, organisation type and deprivation.

Key findings: Pharmacy data were obtained from 76 (52%) local authorities. Following removal of unidentifiable pharmacies, 3069 were analysed – 56% of the estimated 5461 commissioned pharmacies in England. Bivariate correlations indicated a significant negative correlation between EHC provision and Index of Multiple Deprivation score. Greater deprivation correlated to greater EHC provision. A One-way ANOVA demonstrated significant differences between organisation types for MUR provision (larger organisations providing greater volumes). EHC provision demonstrated significant differences between groups and a U-shaped association; large multiple and independent organisations had higher levels than medium and small chains. A two-way ANOVA showed no significant interaction between deprivation and organisation type.

Conclusions: EHC provision does not increase linearly with organisation type. Deprivation appears a more reliable indicator of EHC provision. Provision is likely influenced by local factors but could increase with a nationally commissioned service.

Keywords: community pharmacy; community pharmacy; contraception; health promotion; new contract; pharmaceutical public health; pharmaceutical needs assessment; research method

Introduction

Community pharmacies within England operate as commercial entities, making business decisions on how to provide healthcare and meet patient and customer needs. There are several organisational models, ranging from single-owner contracts to large multiple-contract businesses. Not all countries permit ownership of several pharmacies by one organisation, and some countries (such as Australia, France and Germany) require ownership to be restricted or linked to a registered pharmacist.[1] There are no such specific prerequisites for businesses to hold NHS pharmacy contracts in England. However, all pharmacies operate with a named responsible pharmacist for the day and all organisations have a superintendent pharmacist with overall professional responsibility.

It has been reported that England operates in an environment with less direct regulation compared to much of Europe, allowing businesses to operate at greater efficiency than in other countries.[2] The English Community Pharmacy Contractual Framework has developed incentives for many specified activities, which contributes to a relatively higher efficiency and societal benefits through balanced market and healthcare objectives.[2]

Different pharmacy organisation types can operate in different ways. For example, networked pharmacies in Australia, which connect two or three pharmacies closely located through a shared ownership model, allow sharing of workload. They have been shown to share a strategic approach to service provision (where pharmacies share resources and best practice) not exhibited by individual pharmacies.[3] This is also exhibited in the UK, where large pharmacy chains are seen to have advantages of scale, such as operational capability, purchasing power and service provision.[4, 5] Within England an estimated 40% of pharmacies are independent (i.e. less than 6six pharmacies in the business), 40% very large chain pharmacies and the remainder are small chains.[6]

Previous literature has explored the role that organisation type can have on non-dispensing activity, commonly referred to as services. Services within England can be commissioned through several routes but can be loosely grouped into national services (eligible to be provided by all pharmacies) and local services (may be commissioned in some areas, based on local

priorities following local specifications). Analysis through multilevel logistic regression of national services by Jacobs *et al.* has demonstrated that organisation type is a strong predictor for national service provision.[7] Organisations with greater numbers of pharmacies are more likely to provide greater volumes of national services, irrespective of prescription volume.[7] In particular, 'large multiples' (more than 200 pharmacies within the organisation) were shown to provide higher numbers of Medicines Use Reviews (MURs) consultations.[7]

This is an example of businesses responding differently to prevalent market forces. It has, however, been suggested that the 'corporatisation' of community pharmacy in England is having negative impacts on the pharmacy network.[4, 5] Specifically, concerns include a desire to 'rationalise' the care provided to patients, as well as qualitative indications that small owner-operated pharmacies are more likely to provide personalised care.[4, 5] This may reflect a balance between the efficiency of business operations and meeting specific local needs.

The free-of-charge provision of Emergency Hormonal Contraception (EHC) without a prescription, as a locally commissioned service, seems a key example of this balance between business efficiency and local need. This service has historically been stigmatised and there have been suggestions that large companies may be reticent to provide EHC for fear of negative publicity linked to shareholder concerns, a factor not generally present with smaller companies.[5] Similarly, the largest single organisation has previously been criticised for its high prices of private EHC sales, maintained to 'prevent misuse' of EHC.[8] This stance was subsequently revised following pressure from MPs and public reaction, giving credence to the implied relationship between large organisational activity and public opinion.[8] Understanding how organisation type influences service provision is likely of interest to policymakers and commissioners alike.

EHC is inextricably linked to deprivation, with women in deprived areas more than twice as likely to have a termination than those in the least deprived.[9] Without understanding the influence of deprivation it is difficult to interpret the context of the findings. Accordingly, this study considered EHC provision alongside deprivation measured by the Index of Multiple Deprivation (IMD).[10] IMD is the measure of relative deprivation between lower-layer super output areas, an area of between 1000 and 3000 people.[11] The measure of deprivation comprises seven domains including income, health and disability and crime.[10]

No published evaluations were found of local services and the impact that organisation type has on their provision. Given the previous contention, reviewing EHC provision across England may provide further insight into the role organisation type has on both individual patient care and the level of activity provided.

Data on MUR provision and prescription volume were analysed alongside EHC data as a point of reference. The literature has described the relationship between organisation type and national service provision, particularly MURs.[7]

This study aimed to examine the relationship between community pharmacy organisation type and EHC provision. Following this, it aimed to examine the influence of deprivation on this relationship.

Methods

EHC services are commissioned by Local Authorities. Routinely collected EHC data (commissioned community pharmacy provision without prescriptions) were obtained through Freedom of Information (FOI) requests. Private pharmacy sales of EHC were not included in the data set.

In England, 327 potential local authority commissioners of community pharmacy services were identified from the National Office of Statistics dataset.[12] Between March and April 2020, all local authorities were sent an FOI request for data held on EHC provision from community pharmacy commissioned services in the financial year 2017–18. This period was chosen to include a complete year (with seasonal variation), whilst allowing for post-payment verification. Local authorities that did not respond were sent a follow-up request after four weeks. Data were received in various forms including Microsoft Excel, pdf and free text within an email. These were collated and the data were arranged in a similar format, in Microsoft Excel.

Community pharmacy data (number of EHC consultations) were provided by Local Authorities and were matched to national datasets from the NHS Business Services Authority (NHSBSA) using common NHS designated codes as identifiers.[13] NHS prescription and MUR volumes were also collated from the NHSBSA dataset.[13] Where NHS codes were provided by local authorities these were matched with the NHS codes within the NHSBSA data set. Where unique NHS codes were not provided, manual comparison of pharmacy trading names and addresses were used to determine the NHS code. Following the example in previous literature the pharmacies were grouped according to the number of pharmacies in the organisation: supermarket, multiple (>200 pharmacies), medium chain (26–200 pharmacies), small chain (6–25 pharmacies) and independent (<6 pharmacies).[7]

Data from pharmacies were aggregated for the year, and duplicate entries (due to local authority record keeping and/or different financial years) were combined. For each pharmacy, the total number of EHC consultations that year were collected, as well as the total number of MURs for the same period. The mean monthly prescription volume ($\bar{x}Rx$) was also determined, by dividing the annual prescription volume (from the NHSBSA dataset) by the number of months where more than 0 prescriptions were claimed for. Finally, the index of multiple deprivation (IMD) Rank for the lower-layer super output area of the pharmacy was matched from national datasets.[14] The data were collected in Microsoft Excel, before being transfer to IBM SPSS v27 for further analysis.

The data were reviewed, and bivariate correlations were calculated between EHC, MURs, $\bar{x}Rx$, and IMD rank. A two-way analysis of variance (ANOVA) and post-hoc tests were then undertaken. Ethics approval was granted by Keele University Faculty of Medicine and Health Sciences Research Ethics Committee (ref MH-200114).

Results

FOI responses highlighted the complexity of local authority commissioning, with several county councils commissioning on behalf of numerous smaller district councils. A review of commissioners resulted in 147 local

authorities who commissioned public health services within England being identified. Of these 147, 76 (52%) were able to provide data separated by individual pharmacy premises.

Data from these 76 Local Authorities were for 3195 community pharmacies. In some instances, a lack of clearly identifiable markers meant the individual pharmacy could not be identified and these data were excluded, reducing the data set to 3069 (96%). Within England, in 2017/18 there were 11 619 community pharmacies of which an estimated 47% were commissioned to provide EHC services.[15] The dataset of 3069 represents 56% of the estimated 5461 pharmacies commissioned to provide the service. These 3069 pharmacies collectively provided 180,478 EHC consultations.

The data grouped by organisation type are presented in Table 1. Bivariate correlations were undertaken between EHC provision, MURs, $\bar{x}$Rx, and IMD rank. EHC provision significantly correlated with $\bar{x}$Rx (0.063, P = 0.000), and IMD rank (−0.074, = 0.000). MUR provision shows similar relationships with both $\bar{x}$Rx and IMD, but these are not significant. All the correlations are displayed in Table 2.

Supermarket data adds a layer of complexity to the analysis with no discernible difference in the interpretation. Whilst they are part of very large organisations the low number of pharmacies within that organisation means many of the expected traits are not clearly exhibited. Therefore, the small numbers of supermarkets were excluded from further analysis.

The mean annual consultations per pharmacy for EHC and MURs are displayed in Figure 1. MUR provision appears to trend downwards with organisation types of reduced size. No obvious trend appears visible with EHC provision.

A one-way ANOVA was performed to compare the effect of organisation type on EHC provision. This revealed that there was a statistically significant difference in EHC provision between organisation types ($F(3,2903)$ = 4.827, P = <0.05). Fisher's least significant difference post-hoc test found that there is no statistically significant difference between large multiples and independents, or medium and small chain organisations. The organisations are in two groups, not following the expected trend in with organisation types displayed by MUR provision. Instead,

Table 1 Service provision data grouped by organisation type

		Annual EHC	Annual MUR	Monthly $\bar{x}$Rx
Large multiple (more than 200 pharmacies)	N	1471 (47.9%)		
	Mean consultations per pharmacy (SD)	64 (175)	346 (87)	7973 (3988)
	Range	0–2616	0–476	602–24 804
Medium (26–200 pharmacies)	N		268 (8.7%)	
	Mean consultations per pharmacy (SD)	29 (49)	400 (100)	8980 (3901)
	Range	0–332	0–456	337–23 681
Small chain (6–25 pharmacies)	N		259 (8.4%)	
	Mean consultations per pharmacy (SD)	37 (69)	295 (143)	8369 (4286)
	Range	0–543	0–461	1443–33 124
Independent (5 or fewer pharmacies)	N		909 (29.6%)	
	Mean consultations per pharmacy (SD)	66 (216)	240 (150)	7809 (4162)
	Range	0–5029	0–696	23–27 828
Supermarket pharmacies	N		162 (5.3%)	
	Mean consultations per pharmacy (SD)	52 (79)	317 (92)	5414 (2453)
	Range	0–497	60–367	1694–13740

Table 2 Bivariate correlations for EHC provision, mean prescriptions and national services (individual pharmacy n = 3069)

| **Correlation is significant at the 0.01 level (two tailed)		EHC	$\bar{x}$Rx	MUR	IMD rank
Total EHC	Pearson correlation		0.063**	0.015	−0.074**
	Sig. (two-tailed)		0.000	0.418	0.000
$\bar{x}$Rx	Pearson correlation	0.063**		0.219**	−0.090**
	Sig. (two-tailed)	0.000		0.000	0.000
Total MUR	Pearson Correlation	0.015	0.219**		−0.027
	Sig. (two-tailed)	0.418	0.000		0.137
Index of multiple deprivation rank	Pearson correlation	−0.074**	−0.090**	−0.027	
	Sig. (two-tailed)	0.000	0.000	0.137	
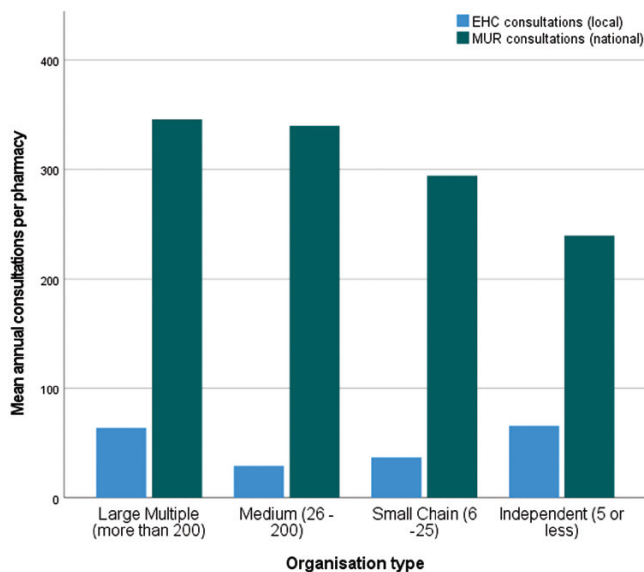
Figure 1 Mean provision of national services and EHC by contractor type.

there is a U-shaped association; large multiple and independent organisations had higher provision levels than medium and small chains.

A one-way ANOVA comparing the effect of organisation type on MUR provision also revealed a statistically significant difference ($F(3,2903)$=164.755, P = 0.00). Fisher's least significant difference post-hoc tests found statistically significant differences between large multiple and medium organisations, and small chains, and then independent pharmacies. The apparent trend of lower MUR provision with decreasing size of organisation type is statistically significant, except between large multiple and medium organisations.

Recognising the influence of deprivation on EHC provision, a two-way ANOVA was performed to compare the effects of both organisation type and local deprivation on EHC provision. In this way, the impact of deprivation can be accounted for. There are statistically significant differences in EHC provision between organisation types ($F(3,2907)$=3.347, P < 0.05) and deprivation ($F(4,2907)$ = 3.250, P < 0.05). However, there was no statistically significant interaction between deprivation and organisation type.

Discussion

This study aimed to describe the relationship between local service provision and community pharmacy organisation type. The data presented here indicate significant differences between organisation types and that this follows a U-shaped association; large multiples and independent pharmacies provided greater EHC volumes than medium and small chain organisations. There is however a significant correlation with deprivation, meaning areas of greater deprivation are more likely to have greater EHC provision.

This study considered locally commissioned EHC provisions across England. It reviewed service provision obtained through invoicing data, but did not capture factors such as patient choice, skill-mix or local relationships. Nor does it account for sales of EHC, a further likely contributing variable. The data obtained through FoI requests could not be

independently verified. However, contractual agreements between pharmacies and local authorities include requirements for accuracy, and routine audit processes to validate the information provided and subsequent payments made.

In addition, this analysis is based on the complex commissioning landscape of England, and application outside this setting should be done with care. Nevertheless, the data from 3069 pharmacies represents an estimated 56% of all commissioned pharmacies in England providing some confidence in the generalisability of the data across England.

The strength of this study, in addition to the large dataset, is that the study uses routinely collected data that make the study and future work amenable to replication. A similar methodology could easily be applied to other locally commissioned services regardless of the commissioning model.

The commercial nature of community pharmacy in England means that many elements of patient care are contracted on an 'opt-in' basis. Pharmacies make decisions to provide additional service activity based on current business priorities, including perceived patient need.

Autonomy is a key influence on service provision, with some evidence that employee pharmacists (more common in larger organisations) have reduced levels of autonomy to make decisions about service provision.[16] Whilst there is evidence indicating there is no difference in professional standards or professional orientation between organisation type, this does vary for business decisions.[17] Business decisions would likely include responding to market pressures, such as contracting and business priorities. A desire from larger organisations to 'rationalise' products and services, has been hypothesised to result in reduced engagement with local, bespoke services.[5]

Previous literature has indicated that organisation type appears to be a strong predictor of national service provision.[7, 18, 19] Larger organisation types have been shown to provide significantly greater volumes of national services, particularly MURs. The data presented here supports this trend. This has been attributed, through qualitative interviews with pharmacy staff, to organisational pressure, target setting, management structure and investment in training.[7, 18] Previous literature has highlighted the impact of organisation type and culture, resulting in greater volumes of national service provision.[16, 18] Incentives and pressure are presented as negative facets of service provision in larger organisations; however, the increased service volume may better meet patient need.[16, 18]

There is extensive literature linking organisation type to national service provision, but little similar analysis of local service provision. Depending on the interpretation of market forces, they may increase local service provision (responding to local patient need); or reduce local service provision (e.g. to rationalise business to focus on national priorities).[7, 20] Previous conclusions from the literature of national services suggest larger organisations are possibly more likely to focus on national priorities, and thus de-prioritise local services.[6, 16] In this context it is inferred that this indicates larger organisation types agreeing targets for national services, rewarding national service performance, focussing training on these services, and in some instances choosing not to provide some local services.

Reviewing the mean annual provisions (Figure 1) show this is not the case with EHC provision. There is no obvious trend in EHC provision with organisation type. National MURs showed significant differences between organisation type, with larger companies providing greater service volumes.

This study found that this was not the case with EHC provision. The post-hoc tests indicate that whilst there are significant differences in EHC provision between different organisation types, these do not display a linear relationship of larger companies providing greater volumes. Instead there is a U-shaped association; large multiple and independent pharmacies provided more EHC than small and medium chains.

However, individual pharmacy EHC provision does display significant correlation with $\bar{x}$Rx and the IMD rank. IMD is the measure of relative deprivation between lower-layer super output areas, with one being the most deprived area. In this case, greater deprivation correlates to greater EHC provision. Greater deprivation also correlates with greater $\bar{x}$Rx.

Whilst the *inverse care law* (where areas of greater deprivation have reduced access to healthcare) is well known, community pharmacy has been shown to display the opposite.[21, 22] This may well also reflect market forces driving business decisions. Increased deprivation is known to correlate with greater prescription volumes, and thus greater business opportunities/pharmaceutical need.[23] Confirming the positive relationship between community pharmacy activity and deprivation is important when considering routes to tackle health inequalities. Understanding how market forces and patient need support viable community pharmacy businesses is important to maintain and utilise this provision, which may be of greater concern in rural areas.

Deprivation is also known to correlate to EHC need and variability in access.[24, 25] The data presented here confirm this link. The correlations here also demonstrate greater EHC provision in areas of greater deprivation. This is another case of local patient need, apparently driving pharmacy activity. The literature has not demonstrated a significant correlation between community pharmacy EHC services and under-18 pregnancy rates, but the correlation here suggests a relationship between patient need and service provision.[15]

The strong role of deprivation on EHC provision is an important potential confounder that warrants exploration. The two-way ANOVA attempts to control for this by exploring interactions. In this way a possible scenario of a certain group of pharmacies being more populous in deprived areas is accounted for. The lack of interaction between organisation type and deprivation gives confidence to the findings. Whilst greater deprivation is correlated to greater EHC provision, this does not affect the role of organisation type.

The results presented here may be of interest to policy makers and commissioners, across international practice. The results confirm community pharmacy's ability to target care to areas of deprivation, making community pharmacy an attractive commissioning option. Moreover, there is an apparent difference in activity depending on the commissioning method (national or local). This feature may warrant further investigation to understand how different commissioning methods are best used to achieve commissioning goals.

Future research would be helpful to understand trends with other local services, such as the treatment of common conditions (often called minor ailments). Furthermore, a greater understanding of the role of deprivation in community pharmacy service provision is likely of interest to health systems aiming to tackle health inequalities.

Conclusions

It is known that community pharmacy organisation type is correlated to national service provision such as MURs. However, this assertion has not been tested with local services. This data suggests that EHC provision does not increase in line with a greater size of organisation type. Deprivation is a strong predictor of service provision, particularly evident in EHC provision.

It is known that community pharmacy access is greater in deprived areas, where EHC need is greater. The results presented here add strength to this, substantiating decisions to commission EHC services from community pharmacy. Given the correlations found between national services and organisation type, it is feasible that commissioning EHC nationally may change service provision from organisations responding to a change in market conditions.

Conflict of Interest

N.T. is primarily employed by the Company Chemists' Association, a trade association representing large multiple community pharmacies.

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