An investigation of occupational subgroups with respect to patient safety culture

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ABSTRACT

There are varying views about the consistency of safety culture across a given organisation or industrial sector: some view it as homogeneous, whereas others have suggested the presence of sub-cultures that vary according to the work group or worksite. This paper reports on a study in which job characteristics and safety climate ratings from a sample of British community pharmacists ($N = 860$) were subjected to a cluster analysis, with the aim of identifying whether discrete groups can be identified on the basis of these ratings. A four-cluster solution was obtained from the analysis. Examination of quantitative and qualitative data from each cluster led to them being identified as: (i) the disenfranchising pharmacy; (ii) the perilous pharmacy; (iii) the safety-focused pharmacy; (iv) the challenging pharmacy. On the basis of the data obtained, safety culture appears to have both characteristics generic to all community pharmacies and characteristics specific to each cluster, with a number of social and organisational factors influencing the culture in any one setting. Implications for the modelling and assessment of safety culture are discussed.

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1. Introduction

1.1. Safety culture and safety "sub-cultures"

Safety culture (and its manifest form, safety climate) has become firmly established within organisational research and practice as a construct for explaining and predicting safety-related behaviour (Choudry et al., 2007). However, its increasing popularity and application across a wide range of industries has led to debate about what it means to refer to an industry's "safety culture". In technical terms, safety culture is commonly held to consist of the prevailing beliefs, attitudes and behavioural norms with respect to safety. The most recent models presented in the literature depict safety climate as a product of workers' perceptions about the extent to which safety is enshrined in organisational policy and practice; for example, the perceived congruence between what the organisation says about safety and what it does in practice to support safe working (Clarke, 2010; Zohar, 2010). Rasmussen (1997), meanwhile, puts safety culture into the context of the broader operating environment, which consists of social and political influences, economic conditions, educational standards, and technological advances. Such models have an interpretative nature to them – that is, they attribute safety culture to workers' sense-making about their work environment (Glendon and Stanton,

2000; Zohar, 2010). Taking such a view generates further questions about how safety culture is "constructed" through such a process: what are workers making sense of? Is the safety culture of a given industry a homogeneous entity, or can it vary within that industry?

The idea that alternative sub-cultures are present has been explored in a number of studies. Lucas (1992) and Richter and Koch (2004) have outlined distinct "archetypes" of safety culture, each of which embodies its own set of assumptions about the nature of risk, how accidents are caused and the approaches that should be taken to prevent them. These authors further contend that archetypes can either occur interchangeably, or coexist, within an organisation. For example, Luria and Yagil (2010) found that, within manufacturing organisations, individual differences can be found in safety perceptions according to each employee's referents; a general distinction was found between permanent employees, whose referents were the organisation (that is, how important safety appears to be across the organisation as a whole) and the work-group (the perceived importance of safety within the work-group), and temporary employees, whose referents were the individuals with which he or she was working. The authors argued that their findings challenge the concept of a single, uniform safety culture within an organisation or an industry sector.

While Luria and Yagil's study looked at differences between individuals, Cheyne and his colleagues (Cheyne et al., 1998; Hartley and Cheyne, 2009) have argued that differences in safety culture can exist between worksites. Cheyne et al. (1998) found that within one multinational manufacturing organisation, statistically significant differences were found between sites on quantitative measures of safety climate. Hartley and Cheyne (2009),

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however, investigated similarities and differences across an industry rather than within one organisation. Their interviewees – senior managers from construction companies – alluded to the presence of both a common safety culture and various subcultures. The former reflected general characteristics of the construction industry as macho and relatively less educated. The latter emerged as a result of interaction between the different contractor and subcontractor firms involved, as well as the way in which specific sites are managed. Similar findings to the latter have been obtained from surveys of Norwegian petroleum workers: the installation at which each respondent worked, or the work group within which he or she worked, accounted for a greater proportion of variance in safety climate scores than did the company that employed the respondent (Høivik et al., 2009; Bjerkan, 2010).

Weyman et al. (2006), meanwhile, examined safety culture across train operating companies (TOCs) in the United Kingdom. Like Hartley and Cheyne, but unlike Luria and Yagil, they found little evidence for individual differences in safety perceptions between types of employee; the types in their case (and Hartley and Cheyne's) being occupational groups such as train drivers and guards. The authors argued that in fact, there were more commonalities than differences between the TOCs, due to all of them being in the same operating environment (in Rasmussen's (1997) sense of the term). Nevertheless, they did find some evidence for cultural differences between "technical" staff, whose main interest was in the technicalities of train operations, and "non-technical" staff, whose background was in other (non-railway) sectors and whose main interest was in commercial matters.

Hence, there are differing levels of support for the existence of subgroups that reflect variation in safety culture. The current study draws upon quantitative and qualitative data from a survey carried out in one healthcare sector, with the aim of identifying whether meaningful subgroups can be found with respect to patient safety.

1.2. Study setting: community pharmacy

As in other sectors of work, safety culture has become of increasing interest to healthcare (Nieva and Sorra, 2003; Flin, 2007). Here too, some authors have examined the issue of whether culture should be conceived of in a singular manner or as a collection of cultures. For example, Charles et al. (2011) studied eight British secondary healthcare organisations and found that, with regard to safety performance, each organisation could be classified as one of four types: resilient (capable of maintaining stability); adaptable (able to develop coping strategies in the event of organisational crises); in recovery (coping with crises, but with difficulty); and conservative (relatively resistant to change). They also noted a range of factors that affected safety cultures in each organisation. These factors included ones both internal and external to the organisation, for example funding, safety leadership, workload, staffing, and risk awareness amongst staff. Provonost and Sexton (2005), though, have argued that safety culture should be considered an even more local phenomenon. They found that safety climate scores varied more between work units within a hospital than they did between hospitals. Hence, it is important to take into account unit-level influences on safety.

One healthcare service that is characterised by a diversity of unit-level characteristics is community pharmacy. This service plays an important role in ensuring the safe use of medication; a large proportion of medication prescribing and dispensing occurs in primary care (Department of Health, 2004), with an estimated 785 million prescription items being processed each year in England and Wales (National Health Service, 2008). Estimates of dispensing error rate vary between studies, but many of these suggest a figure of between 0.01 and 1.7% (e.g. James et al., 2009; Ashcroft et al., 2005).

Of particular interest is the status of community pharmacies. In the United Kingdom, they differs from other healthcare providers in that they exist only outside of the state-funded National Health Service, and hence operate as commercial enterprises. Some are small and independently run, while others form part of large retail corporations (for example, supermarket-based pharmacies). Hence, while all of them have a common need to maintain viability as a business in addition to providing healthcare services, they will also vary in organisational structure and the style and priorities of their management. This in turn causes some variation between pharmacies in terms of characteristics that could impact on safety (Phipps et al., 2009).

2. Methods

2.1. Study design and sampling

This study used data collected from a cross-sectional survey of registered community pharmacists in Great Britain (Phipps and Ashcroft, 2011). The sampling frame for the survey was 2000 community pharmacists selected at random from the Royal Pharmaceutical Society of Great Britain's (RPSGB) membership database. Within this frame were pharmacists working for various types of pharmacy, which ranged from independent (single-site) pharmacies, through small- and medium-sized pharmacy chains (multiple-site organisations), to large chains and pharmacies embedded within supermarkets. The pharmacists' roles also varied, including proprietors of independent and small chain pharmacies, branch managers (who run pharmacies within a chain), second pharmacists (who are based at a pharmacy but have no managerial responsibility), relief pharmacists (who are employed by a chain but move between sites as required) and locum pharmacists (who work at any pharmacy on an agency basis rather than being permanently employed by a single agency).

2.2. Measures

The measures included in the survey were: the Effort–Reward Imbalance indicator (ERI; Siegrist et al., 2009); the Job Contents Questionnaire (JCQ; Karasek et al., 1998); and the Pharmacy Safety Climate Questionnaire (PSCQ; Ashcroft and Parker, 2009; Phipps et al., 2011). All three are self-report measures. The ERI and JCQ both measure the respondent's perception of job characteristics but are based on different theoretical models. The effort-reward imbalance model proposes that job strain is a product of the interplay between the effort that a person makes at work and the rewards (psychological or material) that the person gains from it. The demand-control-support model that underlies the JCQ takes an alternative view: it is the interplay between the demands placed on the person by the job, the resources available to the person at work, and the support provided by colleagues and/or supervisors, that produces job strain (Van der Doef and Maes, 1999). Both measures were used in the current study to obtain alternative views of job characteristics in the study sample. The PSCQ is based on a theoretical model of organisational learning in healthcare organisations (Parker, 2009), and was developed using data from British and continental European community pharmacies (Phipps et al., in press). In addition to the quantitative measures, respondents were provided with a free-form box in which to record any thoughts they had about work characteristics and patient safety. These remarks provided a source of qualitative data for the study.

2.3. Procedure

Pharmacists within the sampling frame were sent a copy of the survey questionnaires, and were invited to complete this

confidentially and return it to the researchers by post. No questions were asked of respondents that would allow them to be identified, and received questionnaires were anonymised during data entry. One reminder mailing was sent to non-responders. Approval for the study was obtained from the University of Manchester's Senate Ethics Committee.

2.4. Data analysis

Quantitative data from the questionnaires were entered into version 15 of SPSS for analysis. The following scores were obtained from the data, with alpha (α) reliability scores provided in brackets:

- *Effort–Reward (E–R) ratio [ERI]* – the ratio between the effort required from the respondent ($\alpha = 0.77$) and the rewards (esteem; job security; promotion prospects) that he or she accrues from it ($\alpha = 0.79$). Scores greater than one indicate that effort is greater than reward (Lehr et al., 2010);
- *Overcommitment [ERI]* – the respondent's inclination to commit him- or herself to work ($\alpha = 0.86$);
- *Psychological demand [JCQ]* – the psychological demands (e.g. mental workload) associated with the work ($\alpha = 0.85$);
- *Physical demand [JCQ]* – the static physical load (e.g. holding stressful postures) sustained as part of the work. Because pharmacy work does not usually impose great cardiovascular demand, items relating to dynamic (aerobic) load were not included ($\alpha = 0.89$);
- *Decision latitude [JCQ]* – the level of control (i.e. skill discretion – the scope to use one's skill and creativity – and decision authority – the opportunity to make decisions about one's work) afforded to the respondent ($\alpha = 0.80$);
- *Social support [JCQ]* – the level of instrumental and emotional support provided by other people with whom the respondent works. Because many of the respondents did not have line managers, only items relating to support from coworkers (as opposed to supervisor support) were included ($\alpha = 0.81$);
- *Organisational learning [PSCQ]* – the extent to which the pharmacy staff are engaged in safety improvement activities ($\alpha = 0.92$);
- *Blame culture [PSCQ]* – the propensity of the pharmacy to place blame on individual members of staff for incidents ($\alpha = 0.86$);
- *Working conditions [PSCQ]* – the extent to which the working environment is conducive to safe working ($\alpha = 0.75$);
- *Safety focus [PSCQ]* – the priority given to safety in day-to-day work ($\alpha = 0.75$).

For the purposes of the current analysis, all scores (with the exception of E–R ratio, which is itself a transformation) were transformed to Z scores, facilitating their direct comparison. Qualitative data were transcribed into a database, with each entry being indexed by the questionnaire identifier to allow subsequent matching with the respondent's quantitative data.

To identity subgroups of respondents, a cluster analysis was performed on the quantitative data using SPSS. Initially, each case was allocated at random to either a development subsample ($N = 432$) or a cross-validation subsample ($N = 428$). The development subsample was used to estimate the number of clusters with the following hierarchical procedures (Anderberg, 1973): (i) between-group average linkage and Euclidean distance; (ii) within-group average linkage and Euclidean distance; (iii) Ward's method and squared Euclidean distance. In the absence of any a priori assumptions about the number of clusters to be found in the data, we used hierarchical clustering in order to generate an initial estimate from the data itself, and used three hierarchical procedures to confirm that a consistent solution was being obtained. Once the

number of clusters had been estimated, a further analysis was conducted on the development and cross-validation samples using non-hierarchical (optimizing k-means) clustering (Hartigan, 1975). The k-means procedure begins with a preset number of clusters and pre-determined scores for each cluster, and assigns each case in the sample to the cluster that has the most similar scores. In doing so, it provides a means of refining the results of a hierarchical cluster analysis (Hair et al., 2005).

Qualitative data were compared between clusters using a cross-case analysis method as described in Miles and Huberman (1994). Initially, researcher DLP (a human factors specialist) read through the qualitative data, and on the basis of this reading identified some general themes within each cluster: views about the organisation and profession; safety in the pharmacy; and personal stressors. The themes provided the basis for a more detailed comparison of cases within and between clusters. This comparison was an iterative process to identify: (i) similarities and differences within each cluster; (ii) similarities and differences between clusters; (iii) more specific features of each cluster that could be used to compare and contrast all four of them. During this process, the qualitative data was also compared against the quantitative scores by way of triangulation. The process continued until no new information was being obtained about the similarities and differences between the clusters. Researcher DMA (a pharmacist) reviewed the final analysis for its coverage of the data and its applicability to the study population.

3. Results

Completed questionnaires were received from 860 respondents (42.9% of the sampling frame). Demographic details about the sample, and descriptive statistics from the measures used, are reported in Phipps and Ashcroft (2011).

In all three hierarchical clustering procedures, the agglomeration schedule indicated solutions containing between two and seven clusters. On examining the assignment of cases to clusters in each solution, we rejected solutions of five clusters or more because some of these clusters contained much fewer cases than others, with no obvious difference between the clusters, suggesting a lack of parsimony. However, the four-cluster solution appeared to provide a relatively even assignment of cases to distinct groups (see Table 1). When the analysis was repeated using the non-hierarchical procedure, four interpretable clusters were identified. The cluster scores obtained from this procedure were used as the seed points for an analysis of the cross-validation subsample, which generated a similar solution to that in the development subsample. Therefore, the solution finally chosen consisted of four clusters, generated from a k-means analysis of the entire sample.

The characteristics of the four clusters are shown in Tables 1–3. Table 1 provides the demographic details of respondents in each cluster, while Table 2 shows the response patterns of each cluster to the ERI, JCQ and PSCQ respectively. Table 3 summarises the qualitative characteristics of each cluster. Combining the different types of data led us to interpret the four clusters as follows.

3.1. Cluster 1: The disenfranchising pharmacy

The pharmacists in this cluster are characterised by relatively unfavourable scores on the measures. As with the other clusters their E–R ratios tend towards effort rather than reward, but in comparison to other clusters they have low scores on the PSCQ. Of particular relevance, though, are the low scores on the measures of control over their work (skill discretion and decision authority). Set alongside the qualitative data, these scores suggest a defining characteristic of pharmacists in this cluster: they appear disengaged from the management of the pharmacy, with little sense

Table 1
Quantitative characteristics of the four clusters.

	Cluster			
	1	2	3	4
N	211	107	304	238
Gender (%)				
Male	45.5	52.3	47.4	39.1
Female	54.5	46.7	52.3	60.1
No answer	–	0.9	0.3	0.8
Role (%)				
Proprietor	1.9	2.8	26.6	8.4
Pharmacy branch manager	25.6	23.4	28.9	41.2
Second pharmacist	9.0	10.3	5.9	10.5
Relief pharmacist	8.1	11.2	7.6	8.0
Locum pharmacist	48.3	45.8	23.4	27.3
Other	7.1	4.7	7.2	3.8
No answer	–	1.9	0.3	0.8
Shift pattern (%)				
Standard hours (8 am–6 pm)	68.2	54.2	75.7	71.4
Standard hours with on-call	5.2	3.7	5.3	3.4
Shifts	8.1	13.1	4.9	6.7
No usual pattern	8.5	13.1	3.0	5.5
Other	10.0	14.0	10.5	10.9
No answer	–	1.9	0.7	2.1
Pharmacy type (%)				
Single independent	16.1	8.4	32.6	13.9
Small chain	8.5	10.3	13.8	8.8
Medium-sized chain	13.3	6.5	10.5	8.8
Large chain	53.6	55.1	37.5	54.2
Supermarket-based chain	8.1	17.8	4.9	11.3
No response	0.5	1.9	0.7	2.9
Age				
Mean	46.2	46.4	47.7	45.3
SD	13.5	12.2	11.2	12.0
Years of experience				
Mean	21.1	21.6	23.2	20.6
SD	13.6	12.7	12.4	12.4

Table 2
Mean raw scores on the ERI, JCQ and PSCQ measures per cluster, with standard deviations in brackets.[a]

Scale	Cluster			
	1	2	3	4
ERI				
Effort	9.73 (1.48)	11.22 (0.93)	9.64 (1.71)	11.05 (1.09)
Reward	17.20 (2.59)	13.34 (3.10)	19.91 (2.94)	16.58 (3.11)
E–R ratio	1.37 (0.35)	2.10 (0.65)	1.15 (0.30)	1.63 (0.42)
Overcommitment	12.87 (2.52)	18.16 (3.42)	13.01 (3.33)	17.19 (2.69)
JCQ				
Skill discretion	30.92 (4.13)	28.73 (5.06)	35.58 (4.31)	32.66 (3.97)
Decision authority	31.09 (5.51)	25.13 (6.80)	37.85 (6.30)	31.44 (6.44)
Psych. demand	11.54 (3.27)	17.10 (2.74)	9.98 (3.59)	15.02 (2.99)
Physical demand	4.35 (1.40)	6.14 (1.64)	3.54 (1.26)	5.34 (1.68)
PSCQ				
Org. learning	26.02 (6.25)	18.75 (6.61)	38.33 (5.20)	34.48 (5.18)
Blame culture[b]	9.28 (2.75)	12.44 (2.73)	4.97 (2.31)	7.98 (3.14)
Working conditions	8.37 (2.59)	4.49 (2.34)	12.03 (2.36)	7.94 (2.37)
Safety focus	6.78 (1.74)	5.30 (1.88)	10.31 (1.48)	9.28 (1.43)

[a] While there is a *prima facie* case for conducting an analysis of variance on the values in Table 2, Aldenderfer and Blashfield (1984) caution against the use of this procedure when the dependent variables have already been used in a cluster analysis to create the grouping variable. They argue that a statistically significant difference between the groups is likely to emerge simply as an artefact of the clustering process, rendering the result of the analysis meaningless.

[b] *Note*: high scores on blame culture indicate a *greater* prevalence of blaming individuals.

of influence over how the pharmacy operates and the services it provides.

> I no longer work for a large chain as a relief pharmacist. Having told the non-pharmacist manager that it was dangerous working in the pharmacy at the staff levels we had, I was told "yes, dangerous for our bonuses". [Respondent 765, Locum pharmacist]

> The relationship with general practitioners [and] hospitals is in the main poor, and even worse with nurses and carers. I think we have [our] head in the sand believing we are valued by other professionals, hence there is a tension when dispensing [controlled drugs] and dealing with interactions and errors on [the part of] both general practitioners and pharmacists. We are seen as shopkeepers. [Respondent 113, Locum pharmacist]

> The independents and chains that I work for pay lip service to patient safety matters. They all have books in which to record incidents but this never seems to happen. The books are there, basically, in case there is a PCT check or the inspector calls. All the pharmacies that I work in have very good hard-working staff but the sheer volume of work (and the constantly ringing telephone) puts us all under pressure. [...] In two of the pharmacies I get no lunch break (or tea breaks) so just grab a sandwich [as I go along]. [Respondent 419, Locum pharmacist]

> We have only just had a consultation room fitted, so I am concerned that I am going to come under increasing pressure from the bosses to perform a greater number of tasks. The more "5 minute" or "10 minute" extra tasks I am given to do the greater pressure I will feel. [Respondent 266, Branch manager in a large chain]

> People probably think that the majority of single independents are stuck in the past: poor adherence to SOPs [standard operating procedures]; poor standards generally; poor quality of service. [Chains] are exactly the same – if not worse! Poor adherence to SOPs; awful antiquated premises that are not fit for purpose; money over quality of service at all times; and a 'vision' of community pharmacy that probably the majority of pharmacists are not in agreement with. But we have no backing from our professional body – particularly over dreadful (often illegal) working conditions. [Respondent 3, Relief pharmacist in a large chain]

The comments reproduced here reflect a general sentiment amongst pharmacists in this cluster, which is that they perceive their pharmacies to be focused on profit over safety, and do not appear to be highly valued. For example, respondent 765 left a pharmacy after her concerns about safety were dismissed by her (non-pharmacist) manager. Her experience illustrates the effect of interactions between managers and subordinates, with interactions that engender trust on the part of subordinates enhancing safety climate (Törner, 2011; Michael et al., 2006). Interestingly, respondent 113 reports feeling undervalued by other healthcare professionals, which affects his sense of involvement in (or control over) safety issues that arise from multiprofessional working. The commercial status of community pharmacies could influence the relationship between pharmacists and other healthcare services as the former are, in part, dependent on general practitioners for business referrals (Phipps et al., 2009). Respondent 419 describes pharmacies that espouse an interest in patient safety but whose operating practices (use of incident reporting and allocation of rest breaks) are inconsistent with this interest. As described in the introduction, the discrepancy between *espoused* and *enacted* safety practices is a central feature of Zohar's (2010) pyramid model of safety climate. Respondents 266 and 3 also express a concern that they will neither receive support, nor have their views considered, by their managers or their professional body. Rasmussen (1997) noted that an extra-organisational influence on safety climate is the involvement of regulatory and legislative bodies. For those

Table 3
Qualitative features of the four clusters, as perceived by respondents.

Feature	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Organisational focus	Profit	Profit	Quality/safety	Varies
Influence over pharmacy activities (beyond day-to-day work)	Little or none	Little or none	Much	Little
Pharmacist valued	Little	Little	Much	Much
Motivation/rewards	Low	Low	Variable	Low
Managerial/governance support	Poor	Poor	Generally good	Poor
Resources	Poor	Poor	Good	Poor
Strain	High	High	Variable	Variable
Learning from incidents	Fear of being personally blamed for incidents hinders incident reporting	Too busy to report incidents and fear being personally blamed for them	Variation in how well reported incidents are used to improve safety. Some respondents reported being too busy or fearing blame	Too busy to report incidents and fear being personally blamed for them

groups to play an effective role in safety management, they need to remain cognisant of the conditions under which organisations (in this case, community pharmacies) operate.

Returning to Cluster 1, a final observation to make is its demographic makeup. A large proportion of the pharmacists within this cluster are locums, who are not permanently attached to one pharmacy but instead work at one or more on an agency basis. Such pharmacists are likely to be removed from anything more than the day-to-day operation of the pharmacy by virtue of their contractual position. To quote one of these respondents: "Locuming is the way to go – no pressure to meet targets, etcetera. Just go in, do my job, come out and don't have to worry about running the shop." [Respondent 180, Locum pharmacist]. However, whether being a locum is a cause or a consequence of disenfranchisement – or both – remains a matter for conjecture. It is possible that, as in Luria and Yagil's (2010) study, locums (because they are not committed to a particular employer) have different referents to employed pharmacists when forming safety perceptions.

3.2. Cluster 2: The perilous pharmacy

The pharmacists in this cluster reported the least favourable scores of the entire sample on all of the measures. Hence their pharmacies are labelled as "perilous", because they are, relative to the others assessed in this study, the most likely to foster patient safety incidents and to fail to learn from them. The qualitative data reflects the poor quantitative ratings, with many respondents expressing unease with their working environments.

Today, the workload is simply beyond a joke. Staffing [has] been reduced to unacceptable [levels]. The firm for which I work is now happy to pay compensation for mistakes rather than employ extra pharmacists because the former is cheaper. Simple economics that takes no account of the well-being of the pharmacists who are left. [Incident] reporting is scant simply because the workload does not allow for it. [Respondent 372, Relief pharmacist in a large chain]

Being a pharmacist in a busy branch is probably the worst job in the world and having to work at such high speed is scary. You go home worrying whether you have checked everything accurately. [Respondent 438, Branch manager in a large chain]

The community pharmacist [has] new roles, but what has caused excess pressure is the fact that nothing has been taken away from our role. Very few pharmacies have qualified dispensing technicians. MURs [medicines usage reviews] are expected in numbers of more than two per day by all pharmacy employers, purely for financial gain. When I offer them to my patients, I feel mercenary rather than helpful and I can't spend

the time that was expected when I trained to do them, so quality is poor. I have made mistakes as a community pharmacist, which I get upset about. I do get very tired and sometimes on my day off I feel tired and anxious about incidents or what might happen on subsequent days. I am planning my exit from the profession but [until then] [...] the only way I manage it is to work part time to minimize the ill effects on my health. [Respondent 543, Second pharmacist in a large chain]

Many actions in pharmacy are always determined by patient safety, which a retail manager will never understand. This therefore brings more pressure to the already stressed pharmacist who tries to meet demands by customer and pharmacy (area) manager. [...] I don't think running a [community] pharmacy is a "one man band" any longer. It should have similar structure [to a hospital pharmacy]. [Respondent 107, Second pharmacist in a supermarket pharmacy]

A clear feature that is common to these respondents is undue work pressure, for which the pharmacies are ill-resourced. Respondents 372 and 543 refer to understaffing, or a lack of suitably-trained staff, in their pharmacies. Both respondents further remark that their pharmacies' approach to resourcing and task allocation is dictated by economics rather than by quality and safety. Respondent 543 refers specifically to the provision of an extended service (the medicines usage review), which is a source of dissatisfaction because its manner of implementation appears to be detrimental to overall service quality; a side-effect of spending time on this service is that there is less time available to complete dispensing tasks. In addition to the potential effect on patient safety, respondents 372, 438 and 543 allude to a negative impact of their working conditions on their own and colleagues' well-being. Respondent 107 draws a comparison between community and hospital pharmacy; in the UK, an interview study by Phipps et al. (2010) found that the latter was often perceived to have a larger complement of staff, more comprehensive safety management systems and comparatively little commercial pressure.

3.3. Cluster 3: The safety-focused pharmacy

In direct contrast to cluster 2, the respondents in this group reported the most favourable scores of the entire sample on all measures. The qualitative data suggest that such pharmacies typically provide pharmacists with a good level of resources and allow them the scope to develop safe and high quality services.

When working for a large chain it is sometimes difficult to make senior management understand the implications for example staff shortages on patient safety. Unless pharmacists have a strong mind it is difficult to not let company issues affect you.

I frequently sort out the incidents that have happened in my area for my non-pharmacist area manager. When I ring these pharmacists about the incidents it always seems to me that they have not thought about "ways to prevent" in the future and it nearly is always a case where I would suggest improvements. I think with busy pharmacies they seem to forget the reason behind reporting near misses and incidents. [Respondent 473, Branch manager in a large chain]

I think that the new pharmacy contract has given pharmacists a great opportunity for more clinical involvement [. . .]. There is undoubtedly a bigger workload as a result and it is up to us to manage our time in such a way as to prioritise patient safety. Large companies such as the one I work for are under huge commercial pressure, however they have been very supportive as the pharmacist role has expanded, providing a better staff level and improved skill mix. [Respondent 240, Branch manager in a large chain]

Eighteen months ago I was very unwell and was out of work for six months. On my return, I had discussions with my line managers and many changes were made and were being made to the work processes and staffing levels at that time. The stress levels and workload levels versus time constraints have improved greatly since then. This has made a difference to both patient safety and work conditions for all the pharmacy team. [Respondent 238, Branch manager in a large chain]

I have worked for large corporate retail pharmacies and they have little respect for staffing conditions. Independent pharmacies are more caring towards their staff and patients. [Respondent 416, Locum pharmacist]

I left my previous job due to concerns about patient safety caused by poor levels of staffing, poorly trained staff and high demands from management (targets). These concerns were ignored by the large chain. I now work for a well-staffed chain of two pharmacies [. . .] and do a much larger volume of prescriptions but the difference is [having more] support. [Respondent 577, Second pharmacist in a small chain]

An interesting commonality amongst these respondents' comments is that they all allude to the presence of work pressures that affect pharmacies in the other clusters; respondent 473 even refers to difficulties in focusing the minds of senior managers on safety. However, unlike the other pharmacies, the ones in this cluster are marked out by the provision of resources to cope with the demands, most notably a high level of staffing but also other measures such as work design (respondent 238) and supervisory support (respondent 473). Also of interest is that alternative views are provided from pharmacists working in large chains. On the one hand, a large multi-site organisation will have a formal command structure, which one would expect to provide the basis for a robust safety management system. On the other hand, though, such organisations (in comparison to independent pharmacies) were believed by some of the respondents to have more of a commercial focus, with staff expected to maximise productivity with minimal resources. Large chains account for a smaller proportion (and independents a larger proportion) of the respondents in this cluster than in Clusters 1 and 2, but the argument stands that such pharmacies are not necessarily less safe than smaller organisations; what makes the difference, it seems, is the priority that each organisation gives to quality and safety. Indeed, the reader may recall the remarks made by respondent 3 earlier (in the description of Cluster 1), that pharmacies of any type can be prone to lax safety standards or commercial pressures.

It is also notable that pharmacy proprietors make up a larger proportion of respondents, and locums a smaller proportion, than is the case in Clusters 1 and 2. It is not immediately obvious though why this should be the case; perhaps locums' and proprietors' perceptions of safety climate are directly influenced in some way by the nature of their roles. For example, it could be surmised that working in several pharmacies, or simply being an "outsider", gives locums a different perspective on any one pharmacy than would being a proprietor (or a permanent employee) of that pharmacy alone (cf. Lapalme et al., 2009). An alternative explanation could be that pharmacy proprietors have more control over how their pharmacies are managed, and so almost by definition have more satisfied (notwithstanding external pressures from the operating environment: Rasmussen, 1997) with the balance struck between competing objectives.

3.4. Cluster 4: The challenging pharmacy

This cluster shows a particularly interesting pattern of scores on the quantitative measures. In comparison to the remainder of the sample the scores are, in general, relatively favourable, albeit not so much as those in Cluster 3. However, we noticed that the scores measuring work demand (i.e. effort and overcommitment on the ERI, and psychological and physical demands on the JCQ) were high in relation to the other clusters. Hence, pharmacists in this cluster were labelled "challenging": while they were more conducive to patient safety than those in Clusters 1 and 2, they nevertheless imposed comparable levels of demand on their staff. The qualitative data bore this pattern out.

I have worked at the same shop for 23 years and have seen it as an independent, one of a chain of six shops and now a local branch of a large national chain. Over the last 5 years I have experienced having to cope with frequent changes to many aspects of my work, for example [the use of] computer programs, and increasing requests to fulfil more roles [such as providing extended services] whilst still having to check all the prescriptions and be available to advise [walk-in] customers and find time to train the staff. I feel I have learnt to work smarter but recently have experienced a shift from enjoying the challenge to finding it difficult to cope and wondering if things will continue to demand more and more. [Respondent 482, Branch manager in a large chain]

As a relief pharmacist I am not as much under pressure as store managers, however [. . .] I take on the role of a manager for that day or days I am working in a particular store. There is so much pressure to get all tasks completed, not just prescriptions but the day to day running of the pharmacy [. . .] There is often not enough staff to handle the workload [. . .] On those occasions I go home and often think about what I have to do the next day and worry about getting certain tasks done. Patient safety always has to be at the forefront and with increasing demands and workload on healthcare staff I think patient safety can be compromised. Our biggest enemy is time – either we need more time or less work to complete tasks effectively. [Respondent 686, Relief pharmacist in a large chain]

I feel that my branch is improving as people are being trained, but when asking for more dispensary hours (that is, more hours for core dispensary staff to be hired) we are told to reach a certain target before asking for such things. One major thing slowing us down is resources such as the computer system, but to get another one or be considered for one we need to hit 350 items per day (excluding trays). This does not consider the fact we are busy "walk-in" wise but also have many Nomad trays [medication dispensing systems prepared by the pharmacist] which take up time on the computer, leading to more stress

when patients complain about having to wait even though it may have only taken us 10 minutes to complete. [Respondent 618, Branch manager in a large chain]

As a locum (previously a pharmacy proprietor), work demands vary and usually you are there for one day only. I do find however that the standard of locums varies considerably, and I encourage staff to report the lazy ones to head office as a threat to patient safety. Incident reporting is not widely carried out because of blame attached, but if handled correctly and sensitively it works to raise awareness of what could happen. Every one makes mistakes, they just don't admit it! And with the threat of prosecution, I expect no errors to be reported in the future. [Respondent 736, Locum pharmacist in a large chain]

Due to stresses in my job I have recently moved to be manager of an independent pharmacy. Jobs like this are getting harder to come by and it seemed sensible to take it whilst I had the chance, especially regarding the responsible pharmacist regulations. [Respondent 447, Pharmacy manager]

The general message from these respondents is one of having to cope with organisational changes and work pressures. They have managed to stay on top of their tasks by their own efforts ("learning to work smarter") and those of their employers (providing more trained staff), but they remain concerned about increasing workload. Like respondents in other clusters, respondent 686 refers to a tension between maintaining patient safety and meeting all of the demands placed on the pharmacy, while respondent 618 describes the difficulty in convincing her managers to provide all the resources that she needs, although she does acknowledge that they have made some effort in this regard. Respondent 736 describes a concern shared amongst pharmacists in all clusters, which is that individual members of staff are (fairly or unfairly) personally blamed for any incidents that are brought to light; this concern, whether or not it is justified, can serve to undermine the potential for incident reporting as a tool for organisational learning. In the UK, a recent and widely-publicised court case saw a pharmacist being convicted of manslaughter following a dispensing error (R V. Lee, 2010). As respondent 736 states, such an outcome has likely deterred pharmacists from revealing incidents for which they could be held culpable. Dekker (2011) notes a general trend towards the criminalisation of errors in safety–critical work activities, and that its effect on safety management processes such as incident reporting has not been fully explored.

The presence of elevated scores on the demand scales alongside relatively high reward and control (skill discretion and decision authority) scores, low scores on blame culture and high scores on the other PSCQ scales is, while on first impressions counter-intuitive, consistent with some previous research findings. Calnan et al. (2000) found that a sample of British general practitioners reported high levels of work demand and effort (using the JCQ and ERI), but that, when predicting the respondents' levels of job satisfaction, it was job control rather than job demand that had a statistically significant influence. Calnan et al. put forward some suggestions as to why this should be the case; one possibility is that high workload is seen as a given in general practice, and what makes the difference is the scope that the practitioners have to manage this workload. While the current study involves pharmacists' perceptions of safety rather than doctors' job satisfaction, perhaps a parallel can be drawn between them: the respondents in this cluster accept (or even welcome) high work demand as a feature of the job, as long as they have the personal and/or material resources to meet those demands. An alternative interpretation of this pattern comes from the notion of active learning, in which a work setting which imposes high demand but also provides a high degree of control over the work facilitates workers' achievement of

mastery over their tasks, and so is conducive to learning (Karasek and Theorell, 1990). Indeed, we have found evidence for such an effect in the current data; respondents with high demand and high control scores also had high scores on the organisational learning scale of the PSCQ (Phipps et al., under review). Cluster 4 may have emerged on the basis of this relationship.

With regard to the demographics, the proportion of respondents who are branch managers in chains is higher than for the other clusters. Possibly, this reflects the position of such pharmacists in their organisations' hierarchies: they hold a senior enough position to have control over the running of a pharmacy, but are also subject to the demands placed upon them by senior managers and by customers. In addition, the gender balance is less even than for the other clusters, with 60% of the respondents being female. There is no obvious reason why this should be so; one explanation might be that more branch managers are women than are pharmacy proprietors (Hassell, 2003).

4. Discussion

We have identified four groups of community pharmacists on the basis of their responses to job characteristics and safety climate questionnaires. An examination of the quantitative and qualitative data from these groups indicates both similarities and differences between them with regard to patient safety. To outline the differences first: one group consists mainly of pharmacists who feel that they have less influence than others over the safe operation of the pharmacy; one group perceive their pharmacies to have especially poor levels of safety; the third group, in contrast, consider their pharmacies to be well-run and have comparatively high levels of safety; the fourth group are also well supported, but feel more concerned about workload. The main similarity, which stems from the operating environment of community pharmacy, is a high workload coupled with a tension between expenditure on resources and meeting commercial targets. What differentiates pharmacies across the groups is how each manages this dynamic. Other common features, also arising from the operating environment, include concerns about the level of support available from the regulator and professional associations, and the threat of litigation as a result of medication errors.

There are some limitations of the study that need to be taken into account. Firstly, no data was collected that could link respondents to a specific organisation, only the type of pharmacy – therefore, it was not possible to control for the effect of variation between organisations on respondent ratings. Similarly, the way in which qualitative data was collected meant that there was no opportunity for us to further explore or probe any of the statements made by respondents, or to investigate similarities and differences between views (for example, those of proprietors/managers, employed pharmacists and locums) within a particular organisation. Secondly, no data was collected from other pharmacy staff (that is, technicians, counter assistants and non-pharmacist managers). The final limitation concerns the analytical strategy; while cluster analysis is a useful method for identifying groups, a caveat to its use is that it is data- rather than theory-driven. The clusters are only "real" to the extent that the clustering variables are representative of the domain of interest and the clusters themselves are validated by other means (Hair et al., 2005). The use of three different questionnaires provides a reasonable coverage of job characteristics and safety climate. In addition, carrying out cross-validation within the sample (in the absence of a second sample from the sample frame) and triangulating the quantitative findings with qualitative data provides further reassurance that the clusters are replicable and meaningful (Clatworthy et al., 2005). However, we should make it clear that the findings of this study are not intended to be a generalisable typology of safety culture

so much as a demonstration of similarities and differences within a given profession.

Methodological limitations aside, several implications for the understanding of safety culture can be drawn from this work. In community pharmacy at least, both of the arguments outlined in the introduction are valid – that is to say, safety culture is a feature both of the sector in general and of specific subgroups within it. At the sector-wide level, the influences on safety culture are the social, economic and political factors suggested in Rasmussen's (1997) model, and are similar to those found in Charles et al.'s (2011) study. Consistent with Clarke's and Zohar's models of safety culture, though, local differences can be found according to organisational-level variables such as managerial support. The latter variables, though, are not necessarily organisation-*specific.* Hence, there is an argument for a model that integrates both "levels" of safety culture. Adopting such a model would have methodological implications for the assessment of safety culture, as it would suggest the need for an increased use of multilevel measurement and intervention (Klein et al., 1994). Indeed, the importance of a multi-level approach has been alluded to in recent studies of hospital safety climate (Zohar et al., 2007; Smits et al., 2009; Allen et al., 2010; Karsh and Brown, 2010; Vlayen et al., in press), and the need to consider how climate might vary between different units within healthcare organisations, as well as between them, is becoming more widely acknowledged (e.g. Sarac et al., in press). As Allen's (2009) study of a hospital midwifery department illustrates, policy developments at the national, sector, or organisational level could have differential effects across work units. The findings of the current study indicate how these can also influence safety in community pharmacies, thus articulating the broader context of the more immediate factors that have previously been associated with adverse drug events.

A further implication of the findings is that, if safety culture is both interpretive and potentially heterogeneous, there is an argument for also viewing it in qualitative terms as a dynamic, social construction – a product of the interplay between worker groups, organisational structures and the wider environment (Rochlin, 1999; Walker, 2010). This would warrant the increased use of ethnographic investigation to capture the mechanisms of safety culture formation and development (e.g. Atak and Kingma, 2011; Flin et al., 2006). For example, one dimension that could be of relevance in multinational organisations is the diversity of national cultures between work units (cf Gelfand et al., 2011).

Two recommendations for future work are as follows. Firstly, there is merit in developing models of safety climate along three lines: (i) the integration of different levels of measurement (for example individual, worksite, organisational, and sector); (ii) the role of interpretive or constructivist perspectives; (iii) the possibility of multiple "types" of safety culture. The second recommendation is to investigate the appropriate level at which to formulate and implement safety management systems; for example, to consider whether they should be implemented within an organisation, across a worksite or across a whole sector, and what links are needed between levels.

5. Conclusions

This study has examined patterns of job characteristics and safety climate across the British community pharmacy sector. From the quantitative and qualitative data obtained, there is evidence to suggest the presence of both common influences on safety across the sector and site-specific influences that vary between pharmacies. Therefore, safety culture should be conceived of in terms of multiple levels; that is, as a characteristic of work units, of work organisations and of work sectors.

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