TOWARDS E-PHARMACY: THE FUTURE INFORMATION AND COMMUNICATION TECHNOLOGIES NEEDS FOR COMMUNITY PHARMACIES IN HARARE, ZIMBABWE

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Abstract

The purpose of this study was to determine the requirements for Information and Communication Technologies (ICTs) systems in community pharmacies. The underlying assumption is a paradigm shift towards a new patient-centred care practice model. A self-administered questionnaire was distributed to a sample of 55 community pharmacies in Harare, Zimbabwe. The most frequently available features in current systems were those listed under pharmacy's internal processes (45%) and these were mainly related to inventory management. Features related to medication safety and drug information and patient counselling were given high priority(91% and 87% respectively) for inclusion in future information systems. In both current and desired future systems features enabling inter-professional collaboration and pharmaceutical services were given lower priority.

Keywords: Information and Communication Technologies (ICTs), E-Pharmacy, Patient-centred care, customer relationship management, knowledge management, pervasive computing

INTRODUCTION

Advances in information communication and technologies (ICT) and information management are fundamentally changing the basis of competition across most industries and the health sector has not been spared. For a long time healthcare has been viewed as an "anonymous public service where normal competitive forces are not in effect" (Stegwee and Spil, 2001). Pharmacy practice being an information intensive profession, has not escaped the changes brought about by technology. Pharmacies have been using computer systems for more than three decades (Webster and Spiro, 2010, Siska and Tribble, 2011). The first systems were designed for dispensing; billing and reimbursements (Westerling, 2011).These have advanced and include applications having a wide range of clerical and medication management functions especially in the developed countries. Industrialised countries have achieved a lot of successes with ICTs in healthcare delivery and there is an opportunity for developing countries to use ICTs in a more integrated way (Coleman, 2010).

Traditionally, the pharmacists' professional tasks consisted of compounding medicines in the pharmacy and dispensing them to the consumers (Viberg, 2009). During recent decades these roles have evolved with the compounding part being taken over by the pharmaceutical industry, creating many new professional tasks for pharmacists but leaving community pharmacists ultimately with the task of dispensing (WHO, 1994). Due to changes in drug prescribing laws and distribution sites, the profession is also under threat from other health professionals who have been licensed to dispense medicines as well as from other providers of pharmaceuticals such as supermarkets. The scope of activities available to individual pharmacists has decreased but at the same time, their training has become more rigorous. These developments have resulted in debates about the pharmacist being an "over-educated" distributor of medicines (Anderson, 2002). More and more community pharmacies find themselves being thrown into the global market place due to the emergence of online pharmacies as well as patients importing their own medicines.

Not only has the profession evolved, the patients themselves have also evolved over the past several years. In most instances, customers in healthcare get in touch with the industry when they are in desperate and sensitive situation where bargaining power is low (Stegwee and Spil, 2001). However through the internet and other means, patients are now taking an active role in the delivery and receipt of their own healthcare and are no longer willing to sit and passively accept information provided by health professionals, including pharmacists (Kenreigh and Wagner ,2000; Stegwee and Spil, 2001). In addition, simple conveniences and respect for valuable time are prospectively more pertinent as patient satisfiers (Joslyn, 2001).

Research Problem

Customer power is increasing due to increasing knowledge. Given such a scenario, it is obvious that the traditional pharmacy practice model is no longer viable. As a result, the pharmacy profession worldwide has made the provision of patient-oriented services its long term priority (FIP 1997). This implies that community pharmacy's strategic vision has to extend practice responsibilities beyond dispensing and provide patient care services (Westerling et al, 2011; FIP 1997). The solution is to stop this apparent misuse of community pharmacists' time. ICTs can be a core driver for this transition. Through utilising ICTs successes have been scored in the United States of America and Europe. Despite the important contribution of ICTs in pharmacy practice in developed countries, its utilization is minimal and largely undocumented in Zimbabwe (Matema *et al*, 2007). ICT development needs for scoring successes similar to those achieved in the developed countries in the context of provision of patient care services have not been explored in Zimbabwe and this forms the foundation of this study.

LITERATURE REVIEW

Modern community pharmacy is the result of a century long evolutionary path. At the turn of the 20th century, the pharmacy profession was both a skilled craft and a retail business (McPherson, 2011). The skilled craft was mainly compounding of medicines. Around the 1900s, community pharmacists were practicing "counter prescribing" (McPherson, 2011). Counter prescribing which is essentially the practice that involves diagnosing, prescribing and dispensing within the pharmacy, resulted in opposition from physicians who viewed counter prescribing as an intrusion to their control over therapeutic decision making (McPherson, 2011). Pressure from physicians and like minded pharmacists resulted in an end to counter prescribing around 1940 (Quadagno, 2004). Pharmacists therefore accepted the responsibility for preparing and distributing medicines ordered by physicians. In a way, pharmacists assumed a subservient status in the healthcare system.

In 1986,The Board of Pharmaceutical Specialties defined pharmacy practice as "that personal health service that assures safety and efficacy in procuring, storing, prescribing, compounding, dispensing, delivering, administering and use of drugs and related articles" (Elenbaas and Worthen, 2009)**.**This definition essentially captures the functions of pharmacists. The traditional role of community pharmacists has been compounding and dispensing medicines. These activities focus on merely delivering the product to the customer. In this model of practice, there has been no substantial emphasis on innovation. Services offered have remained more or less the same for years (Patras, 2007). However as early as the 1970's it has been apparent that the traditional role of community pharmacists has to change (Elenbaas &

Worthen, 2009) and trends such as those listed below have put the profession under even more pressure to change the traditional role of compounding and dispensing. The following trends have necessitated these changes:

1. Due to advances in technology and rise of industrial pharmaceutical companies, the function of compounding in community pharmacies is becoming less important thus leaving the community pharmacist ultimately with the task of dispensing.

2. The consumption of medicines is generally on the increase because of the aging population, the emergence of life-style trends focused on healthy living (Patras, 2007 p.5) and increased disease burden. This has also increased the range of medicines available on the market consequently complicating pharmacy practice.

3. Consumers are no longer limited to local or domestic markets but now they have access to the international markets due to the emergence of internet pharmaceutical retailers. Traditional stores, also known as brick-and-mortars, have relied on proximity and brand-name recognition to entice consumers into making their purchases in their stores. In essence, the sellers drove availability and consumer choice. The Internet has changed that business philosophy. The consumer now can drive the purchase, comparing costs and often product ratings with a click of a button (Evansand Wurster, 1999 in Kenreigh & Wagner 2000). By 2000, there were 326 global online pharmacies on the Web (Gagnon, 2000). This channel of distribution has inadvertently thrown community pharmacies into global competition.

4. The consumers themselves have also evolved over the past several years. No longer are they willing to sit by and passively accept information provided by healthcare professionals. The availability of the Internet has made a tremendous amount of information available at the consumer's fingertips. Patients are demanding to take an active part in the delivery and receipt of their own healthcare.(Kenreigh & Wagner 2000)

5. Due to the increase in the market for generic medicines, the price for medicines has generally been on the decline. This development has its implications on margins and returns. Community pharmacies cannot simply rely on delivering the product to the customer since this is no longer as profitable as before. There may be need to look for other sources of revenue for community pharmacies to remain viable.

6. Recognition of the vital contribution and impact of the pharmacy profession to the community has been reflected by the high level of regulation of the pharmacy profession. However, recent deregulation measures in relation to all aspects of the services marketing mix, "namely products, price, place, promotion, physical evidence, people and processes, have made for a dynamic competitive climate with increasing pressures on the livelihood of

small- to medium-sized enterprises" (Schmidt & Pioch, 2004 p.356). An increasing number of medicines that were normally confined to pharmacies have been deregulated such that they are now available in retail outlets such as supermarkets. This is a serious threat since supermarkets are capable of taking advantage of economies of scale and offer products at a cheaper price. Furthermore, other health professionals have successfully lobbied for the deregulation of some functions traditionally carried out by pharmacists hence the advent of dispensing doctors.

The above factors have clearly contributed to the decreased scope of activities available to individual pharmacists but at the same time, their training has become more rigorous. In Zimbabwe for example, the duration of training for pharmacists at the University of Zimbabwe has been increased from three years to four years. In 1990, the American Association of Colleges of Pharmacy (AACP) mandated that a doctor of pharmacy degree would be the new first-professional degree (www.wikipedia.org accessed 14/02/2012). The PharmD (Doctor of Pharmacy) degree is a professional degree that prepares the graduate for pharmacy practice. It is awarded after completing at least two to three years of undergraduate prerequisites and then four (or three continuous) years of pharmacy school, which include one year of practical experience. Clearly, the community pharmacist is over-qualified to pack, label and dispense medicines. The community pharmacist is qualified to provide patient care services.

Given these ongoing and profound changes, a paradigm shift is occurring in pharmacy practice. The pharmacy profession worldwide has made the provision of patient-oriented services its long term priority (FIP 1997). More specifically, community pharmacy's strategic vision has been to extend practice responsibilities beyond dispensing and provide patient care services (Westerling et al, 2011; FIP 1997).

As professionals, community pharmacists are charged with the responsibility of "protecting society by providing expert services to help consumers manage risks associated with drug therapies" (McPherson, 2011). It therefore follows that pharmacists should move from product distribution to integration of patient-centred care.

Patient-centred care presumes active involvement of patients and their families or caregivers in decision-making about individual options for treatment. True patient-centred cannot be achieved without active patient engagement at every level of care design and implementation. Patient-centred care has been defined as " an approach that adopts (the) perspective of patients- what matters to them either positively or negatively, and their experience of illness" (IOM, 2001) and more specifically as "providing care that is respectful of and responsive to individual patient preferences, needs and values and ensuring that patient values guide all clinical decisions" (IOM, 2007).

There are 4 key attributes of patient-centred care:

- **"Whole-person" care** – health care providers should understand the person as a whole and not just their disease condition. It is important to understand a full range of factors affecting a patient's ability to get and stay well. These factors include the patient's life situation, home environment and personal preferences.

- **Coordination and communication –**clinicians and other providers need to communicate and coordinate their activities for the benefit of the patient.

- **Patient support and empowerment -** Patients not only want guidance from healthcare providers, but they also want complete, unbiased information that enables them to assess all of their treatment options; to discuss side effects and costs; and to review the risks and benefits of various options, including alternative therapies. Respect for patients' preferences, their physical and emotional comfort, and their privacy is imperative in patient-centred care.

- **Ready access –** Each healthcare provider should act as a gateway to other professional and not hinder or limit access to care (Bechtel and Ness, 2010).

Patient-centred care involves much more than simply educating patients about a diagnosis, potential treatment, or healthy behaviour. It does not mean giving patients whatever they want; rather, patients need guidance from their health care providers. They expect that guidance to be provided in the context of full and unbiased information about options, benefits, and risks. Patients' cultural traditions, personal preferences and values, family situations, social circumstances and lifestyles need to be considered (Institute for Healthcare Improvement).

Pharmaceutical care is an expression of patient-centred care in the context of pharmacy services. Don Brodie appears to have been the first to introduce the term pharmaceutical care in 1973, linking the patient's safe use of medicines to the pharmacist (Elenbaas and Worthen, 2009: p.155). Douglas Hepler and Linda Strand re-examined pharmaceutical care in 1989 during the second "Pharmacy in the 21st Century" meeting held in Williamsburg. They argued that pharmaceutical care is the basic philosophy of pharmacy and the patient's safe use of medicines the desired goal. They called the current practice "a collection of disputatious factions and splinter groups, still 'a profession in search of a role'" (Hepler and Strand, 1989 in Elenbaas and Worthen, 2009 p.103). In 1990, Hepler and Strand defined pharmaceutical care as being "the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve or maintain a patient's quality of life" (Hepler and Strand, 1990). In adapting this definition in 1998, the International Pharmaceutical Federation (FIP) added the important dimension of "achieving definite outcomes that improve or maintain a patient's quality of life."

These outcomes are: Cure of a disease, Elimination or reduction of a patient's symptoms, Correcting or slowing of the disease process, Prevention of a disease (FIP, 1998)

This concept of pharmaceutical care has been adopted by pharmacy professional associations and academic training programmes throughout the world and has redirected the community pharmacist's practice towards a more outcome-oriented, patient-centred practice (Hughes et al, 2010). In essence, the scope of pharmacy practice now includes patient-centred care with all the cognitive functions of counseling, providing drug information, monitoring drug therapy as well as technical aspects of pharmaceutical services including medicine supply management (Weidenmeyer et al, 2006). Pharmaceutical care encompasses both the expansion of existing roles as well as the adoption of new roles that were previously considered beyond the scope of traditional pharmacy practice. Pharmaceutical care thus provides opportunities for community pharmacies to tap a new revenue stream.

The goal of pharmaceutical care is to optimize the patient's health-related quality of life, and achieve positive clinical outcomes, within realistic economic expenditures. Pharmaceutical care involves the process through which the pharmacist cooperates with other professionals in designing, implementing and monitoring a therapeutic plan that will produce specific therapeutic outcomes for the patient (Rexy and Shruti, 2006). . This process involves three major functions which are "1) identification of potential and actual drug related problems, 2) resolving actual drug related problems and 3) preventing drug related problems" (Strand *et al*, 1991). In order to achieve the goal of pharmaceutical care, the following principles must be accomplished:

1. Interaction between the pharmacist and the patient must occur to assure that a relationship based upon caring, trust, open communication, cooperation and mutual decision making is established and maintained. In this relationship, the pharmacist makes the emotional commitment to the welfare of patients as individuals require and deserve the pharmacists concern, compassion and trust. In exchange, the patient agrees to supply personal information and preferences, and participate in the therapeutic plan.

2. Pharmacists must collect and/or generate subjective and objective information regarding the patient's general health and activity status, past medical history, medication history, social history, diet and exercise history, history of present illness, and economic situation. Since this information will form the basis for decisions regarding the development and subsequent modification of the drug therapy plan, it must be timely, accurate, and complete, and it must be organized and recorded to assure that it is readily retrievable and updated as necessary and appropriate.

3. Based upon a thorough understanding of the patient and his/her condition or disease and its treatment, the pharmacist together with the patient and with the patient's other healthcare providers, as required, must develop an outcomes-oriented drug therapy plan. The pharmacist assures the coordination of drug therapy with the patient's other healthcare providers and the patient. The drug therapy plan must be documented in the patient's pharmacy record and communicated to the patient's other healthcare providers as necessary. Pharmacists must take full account of all patient and medication factors that may predispose patients to the risk of drug therapy problems. Opportunities for health promotion and preventive healthcare are identified and incorporated within the plan.

4. The pharmacist providing Pharmaceutical Care must assume ultimate responsibility for assuring that his/her patient has been able to obtain, and is appropriately using, any drugs and related products or equipment called for in the drug therapy plan. The pharmacist must also assure that the patient has a thorough understanding of the disease and the therapy/medications prescribed in the plan.

5. The pharmacist is responsible for evaluating actual outcomes in relation to the therapeutic objectives to determine whether drug therapy problems have been resolved (Weidenmeyer *et al*, 2006). The pharmacist coordinates changes in the plan with the patient and the patient's other healthcare providers as necessary and appropriate in order to maintain or enhance the safety and/or effectiveness of drug therapy and to help minimize overall healthcare costs. Patient progress is accurately documented in the pharmacy record and communicated to the patient and to the patient's other healthcare providers as appropriate.

Principles adapted from those prepared by the American Pharmaceutical Association (APhA) Pharmaceutical Care Guidelines Advisory Committee, approved by the APhA Board of Trustees, August 1995). Weidenmeyer et al (2006:p.26) summarized the principles stated above in four steps:

1. Assessing the patient's drug therapy needs
2. Developing a care plan to meet those needs
3. Implementing the care plan
4. Evaluating and reviewing the care plan

But how does the community pharmacist take up these additional roles, given increased workload and a general shortage of pharmacists? ICTs could be a major part of the solution to enable community pharmacists to cope with their expanding roles. ICTs open up possibilities that may influence community pharmacists' professional standing by "shaping their work

practices, jurisdictions, roles, values, power and boundaries" (Petrakaki *et al,* 2011).The availability and advancements in ICTs have resulted in the ability to rapidly and effectively access, retrieve, analyse, share and store large volumes of information pertinent to patient care (Poikonen in Balen and Jewesson, 2000). ICTs can be used to automate processes and practices with the potential to simplify tasks. ICTs can also eliminate unnecessary activities, undertaking mundane tasks and then providing the professionals with processed information upon which they can act (Petrakaki et al, 2011).

In a study carried out for the National Association of Chain Drug Stores (NACDS), it was found out that community chain pharmacists spent more than two thirds (68%) of their time engaged in processing orders and prescriptions, managing inventory and performing administrative duties. Only 2% of community pharmacists' time was devoted to activities involving disease management which is part of pharmaceutical care (Andersen, 1999). Technological innovations in community pharmacy practice are likely to gradually decrease the time pharmacists spend playing distributive roles and allow them to dedicate more of their time to patient-centred activities. In one study it was shown that new e-prescriptions required 26.6% less pharmacy staff time to process than other new prescription (walk-in, phone and facsimile) (Webster & Spiro, 2010). This implies that embracing e-pharmacy has the potential to reduce workloads in pharmacies.   Technology also has the potential to improve patient outcomes since the pharmacist can make better informed decisions through decision support systems and thus ICTs can enhance the role of community pharmacies in patient care services.

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RESEARCH METHODOLOGY

Research Design

The study was a quantitative, descriptive research. There are two basic techniques in descriptive research: cross-sectional and longitudinal. For the purposes of this study, a cross-sectional study was chosen as the most appropriate technique due to time constraints and moreover this study did not intend to observe trends over time.

Population and Sampling Techniques

The target population of the study was registered community pharmacies in Harare. Harare is the administrative capital and commercial centre of Zimbabwe. Harare's community pharmacies were the target population not only for the sake of practicality but also because most of Zimbabwe's community pharmacies are located within Harare. Using the Pharmacists Council of Zimbabwe register (2011) as the sampling frame, the target population was stratified in to three categories according to location of the pharmacy.

The categories were pharmacies located in the: 1) Central Business District 2) High density suburbs 3) Medium/Low density suburbs.

The stratification catered for the apparent socio-economic status differences among clientele found in these areas which may have had a bearing on the results. Quota sampling was used whereby the researcher deliberately set the proportions of strata as they are represented in the population (See Table 2 below). Then a judgment sample of fifty percent (n =55) of community pharmacies in Harare was used to select the required number of subjects from each stratum.

Table 2: The Proportion of community pharmacies in Harare by location

Location of pharmacy	Proportion of total population
Central business district	35%
Low/Medium density suburb	40%
High density suburb	25%
Total	100%

Source: Pharmacists Council of Zimbabwe

Research Instrument

The survey instrument which is a questionnaire, was adapted from the one used by Westerling et al (2011) in a similar study conducted in Finland. Technology features described by Felkey (2010) were also taken into consideration. Extensive literature search as well as the researcher's own professional experience was used to modify the list of information system features used for this research. This resulted in a questionnaire that was customised to be applicable in the Zimbabwe pharmacy system.

Data collection Methods

A survey questionnaire was used to collect primary data which was analysed to yield answers to the research questions. The questionnaire was hand delivered to the sample of community pharmacies, after gaining informed consent. The respondents were given a maximum period of five days to complete the questionnaire, after which any questionnaires not answered were abandoned.

A reminder was sent out to the sampled community pharmacies via email or mobile text messages two days prior to the end of the five day period in which the questionnaire needed to have been completed. This was done to improve the response rate.

**Data Presentation and Analysis Approach**

Data obtained was coded by identifying, classifying and assigning a numerical symbol to the data. The data was then analysed using the Statistical Package for Social Sciences (SPSS) V.19 for Windows 2007 (SPSS Inc, Chicago, Illinois). Descriptive statistics were calculated particularly the mean, mode and range. Cross-tables were also created to examine relationships between variables.

EMPIRICAL FINDINGS

Patient care services

The respondents were asked to list patient care services (if any) offered by the community pharmacy. 85.7% (n=36) of the respondents indicated that they did offer patient care services. Their responses are summarised in figure 1 below:

Figure 1: Patient care services offered by community pharmacies
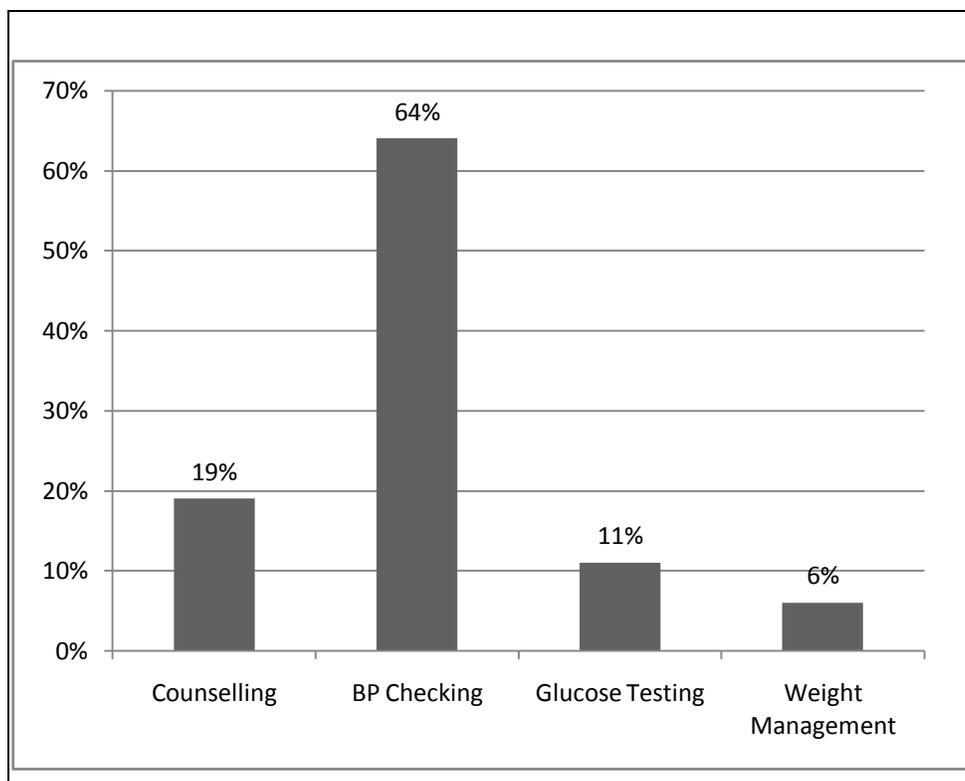
Most of the pharmacies (64%) that did offer patient care services conducted blood pressure checking. Only one pharmacy cited lack of resources as the reason why patient care services were not offered while the rest (n=6) did not indicate why these services were not offered.

Internet Connectivity

33.3% (n=14) did not have internet connectivity within the community pharmacy. This is despite 97.6% (n=41) of the pharmacies reporting that they have at least one computer.

Computer programmes in use

The respondents were asked to identify the computer programme (if any) they use in their community pharmacy. All the pharmacies (n=41) except one used a computer programme to manage operations. The most commonly used software was one called "Dispenseware". The rest of the computer programmes in use are illustrated in Figure 2 below:

Figure 2: Computer Programmes in Use
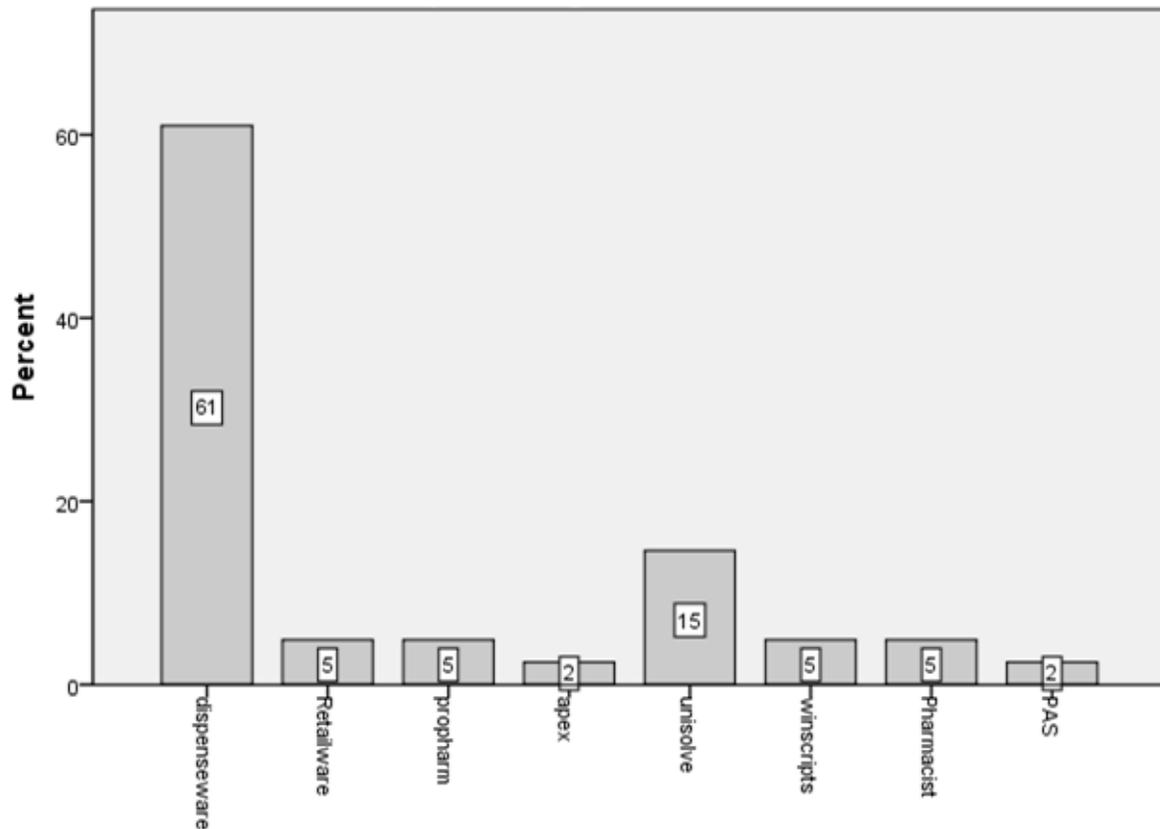
Features of Information Systems in Community Pharmacies

Data for this section was collected in twofold. First of all the availability of a list of features in the current system was assessed and secondly the community pharmacists were asked whether or not it was crucial to include those same features in a future information system

### *Drug Information and Patient Counselling (7 features)*

Figure 3: Availability of Features Related to Drug Information and
Patient Counselling in Current System
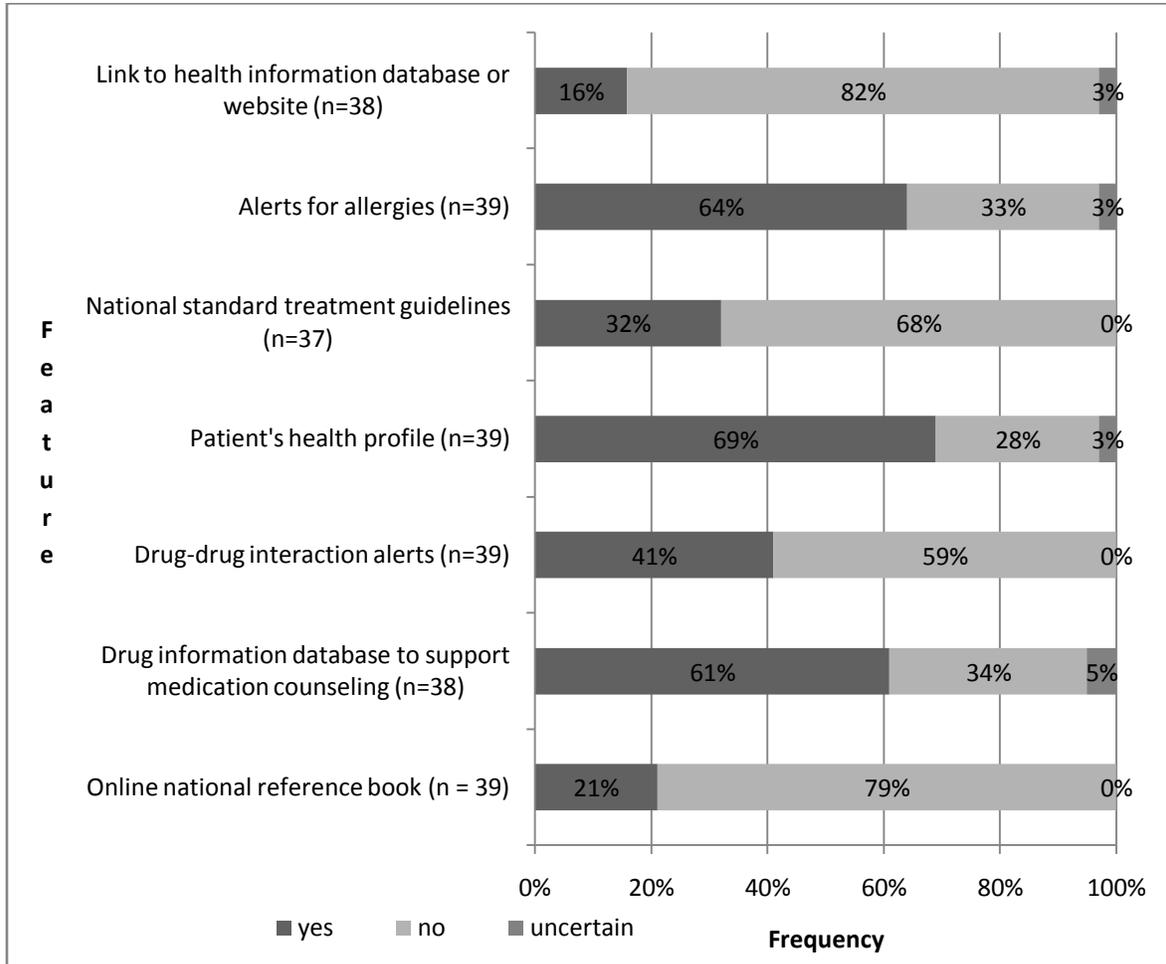
Most of the information systems (69%) had features that captured a patient's health profile. Only 16% reported that they had a link to a health information database or website.

As represented by figure, the features that were mostly available in current systems (patient's health profile, alerts for allergies, drug information database) were the ones to which the community pharmacist strongly agreed that they were crucial in a future system; 74%, 74% and 73% respectively. Only 41% of the systems had alerts for drug-drug interactions and yet 74% of the community pharmacists agreed to have this feature included in a future information system. 63% agreed to have national standard treatment guidelines built into a future system

despite only 32% of current systems having this feature. 56% strongly agreed to have a link to a health information database.

Only 38% of the respondents strongly agreed to the inclusion of an online national reference book in a future information system.

Figure 4: Level of agreement to inclusion Drug Information and
Patient Counselling related Feature in Future System
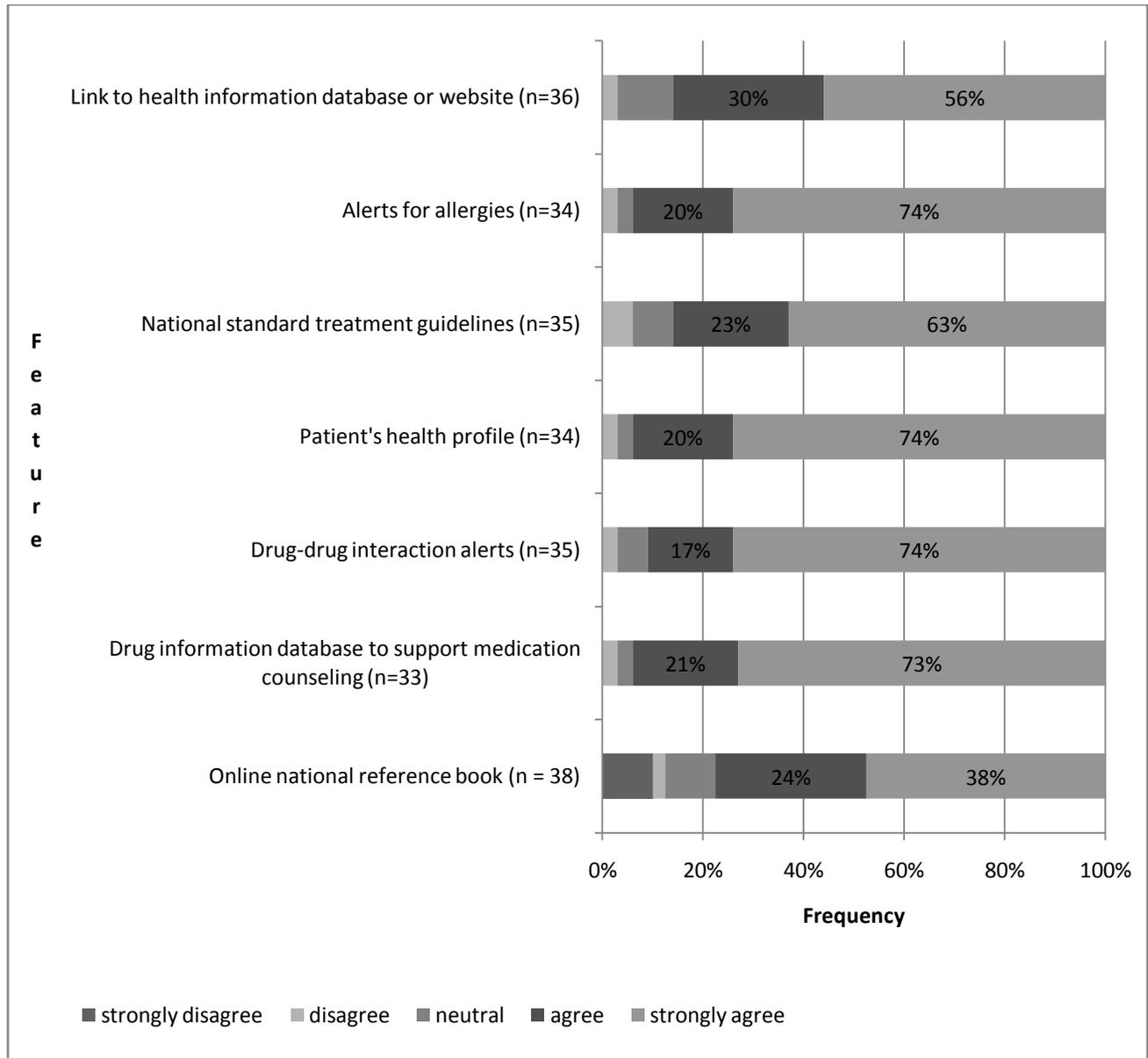
NB: *A total of 42 responses to the questionnaires were received, but the varying values of n signify non-responded to items.*

Medication Safety (6 Features)

Figure 5: Availability of Features related to Medication Safety in Current System
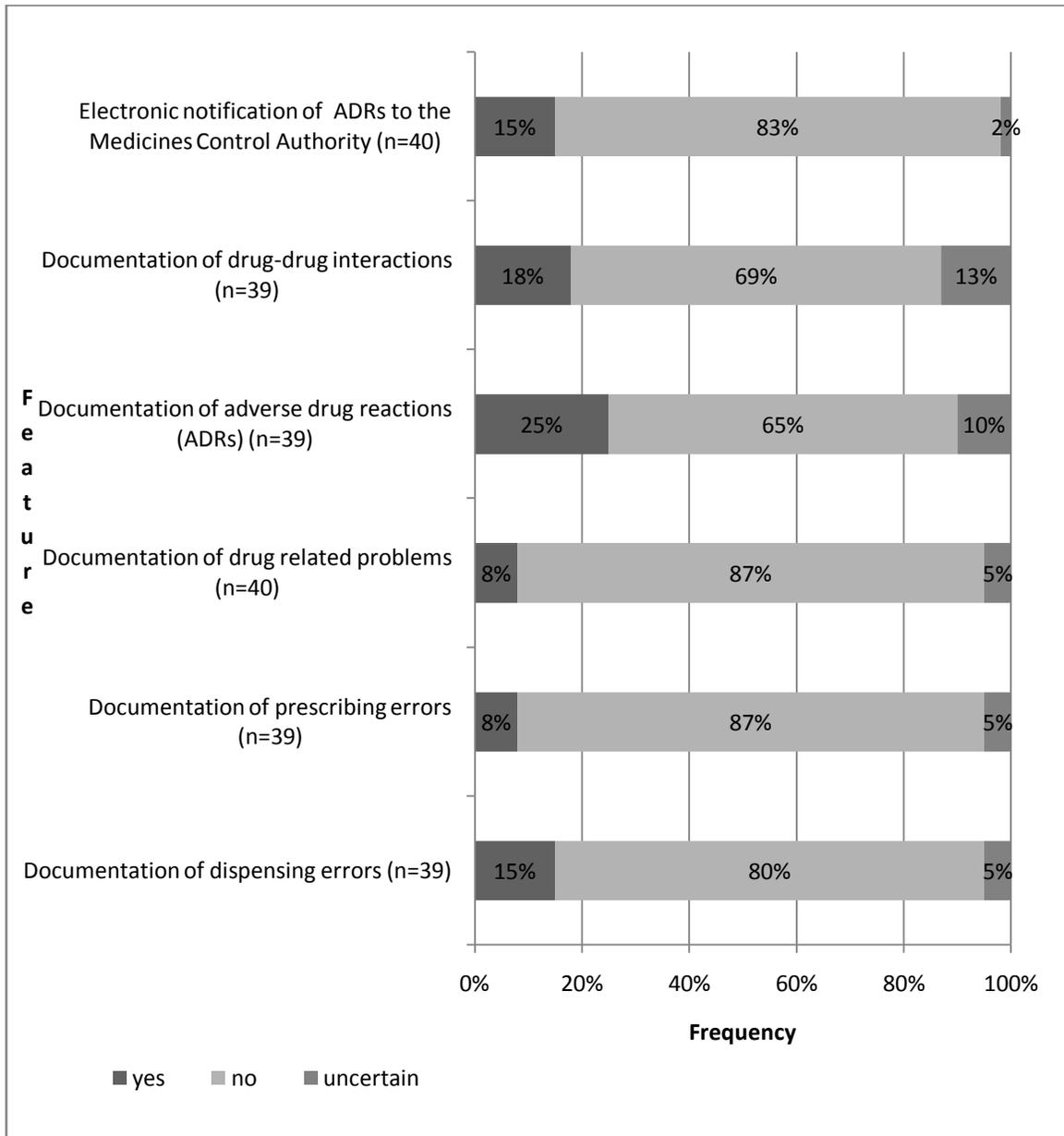
Medication safety related features were mostly not available in current systems. The highest frequency noted was 25% for a feature that documents adverse drug reactions (Figure 5).

Figure 6: Level of agreement to inclusion of medication safety related feature in future system
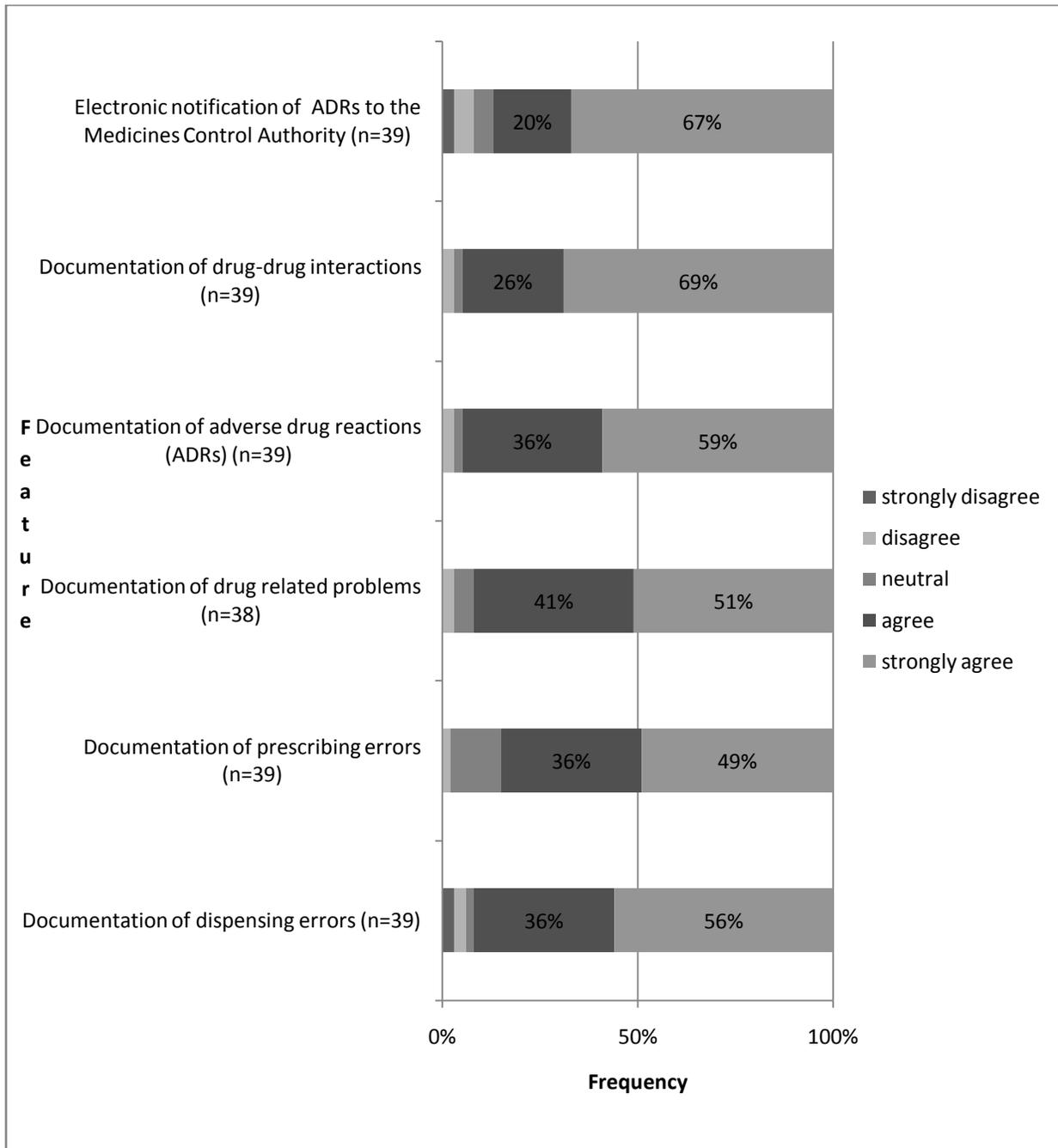
At least 50% of the respondents strongly agreed to the inclusion of five of the six listed features related to medication safety in a future information system. At most, only 5% of the respondents did not agree that it was crucial to add these features.

Inter-professional Collaboration (4 features)

Figure 7: Availability of features related to inter-professional collaboration in current system
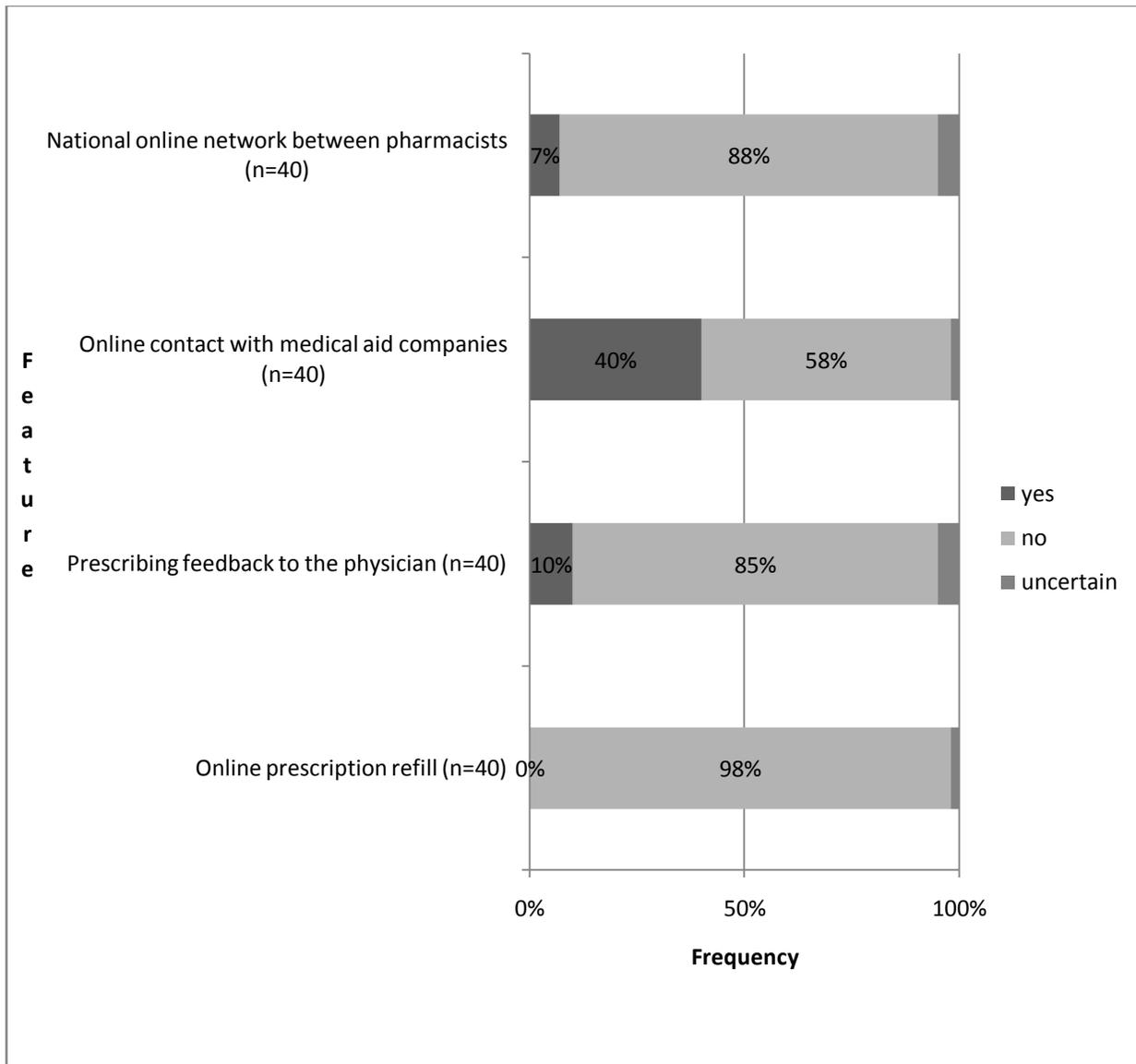
Of the four features listed under inter-professional collaboration, community pharmacists are able to communicate online with medical aid companies using40% of the information systems (Figure 7). It appears none of the pharmacies offer online prescription refill since 98% indicated that that feature was not available and 2% were uncertain whether or not that feature was available.

Figure 8: Level of agreement to inclusion of feature related to inter-professional collaboration in a future system
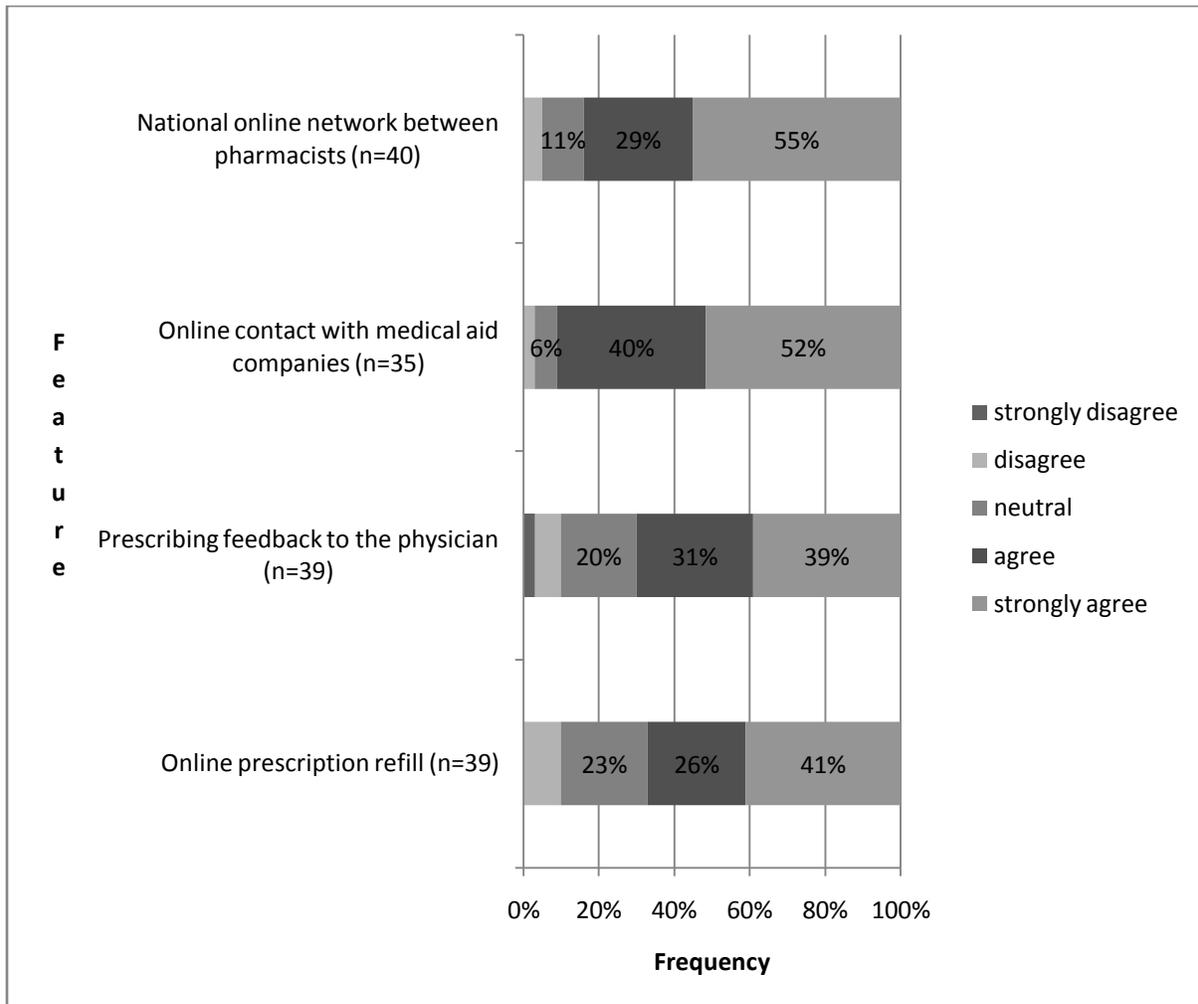
Looking at figure above, there appears to be a general agreement that the four features related to inter-professional collaboration need to be included in a future system. However, quite a number of the respondents opted to be neutral on the issue.

Pharmaceutical Services (12 features)

According to figure below, features related to pharmaceutical services are not dominant in current information systems used in Harare's community pharmacies. Patient health information record and medication cost record are reported to be available in 51% and 45% of information systems respectively.

Figure 9: Availability of features related to pharmaceutical services in current system
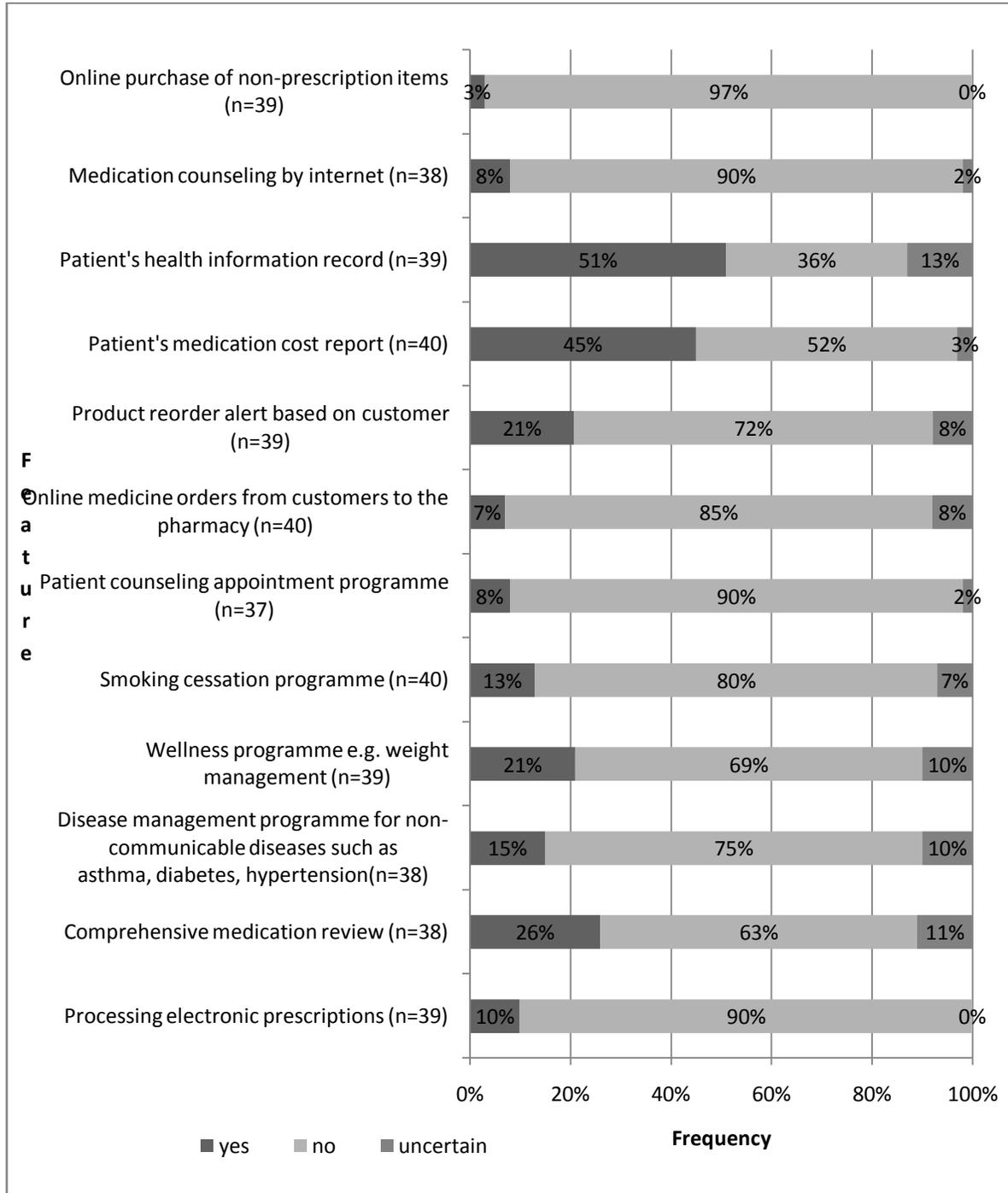
Quite a number of respondents opted to be neutral when it came to level of agreement to inclusion of features related to pharmaceutical services, although most of the responses ranged from agree to strongly agree (Figure 10).

Figure 10: Level of agreement to inclusion of features related to
pharmaceutical services in future system
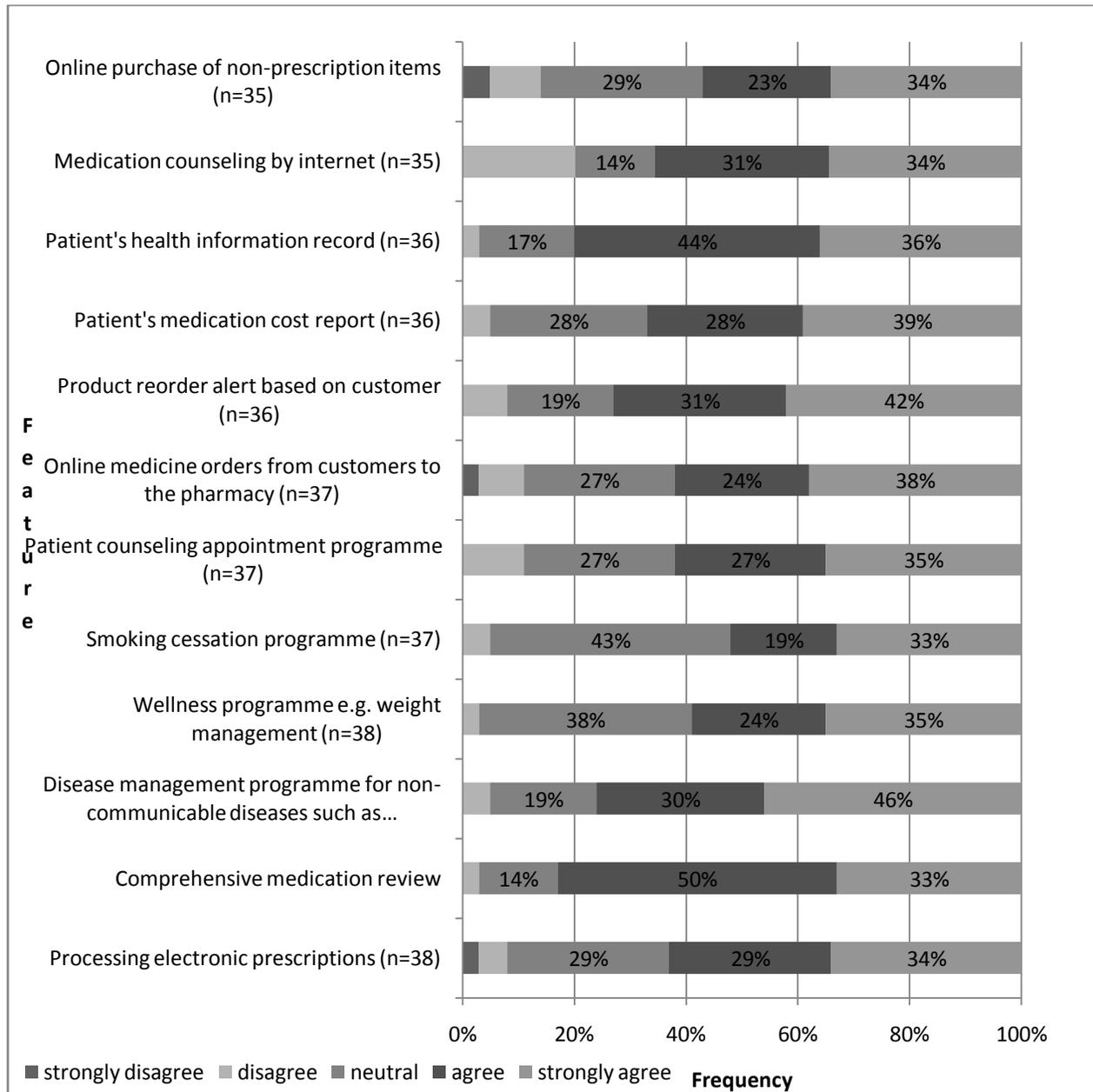
Pharmacy's Internal Processes (20 features)

Most (86%) of the information systems had integrated point of sale, this was followed by analysis of stock movement (84%) and management of stock holding features (76%). (See figure 15 below). Few of the systems scheduled marketing campaigns (5%), placed online orders to wholesalers (11%) or included customer loyalty programmes (38%).

Figure 11: Availability of features related to pharmacy's internal processes in current system

Legend: ■ yes ■ no ■ uncertain

X-axis: Frequency (0% to 100%)
Y-axis: Feature

Feature	yes	no	uncertain
Managing stock holding (n=38)	76%	13%	
Updated product information (n=37)	46%	51%	
Analysis of stock movement (n=37)	84%	16%	
Online orders to wholesalers (n=37)	11%	89%	
Ability to generate orders based on sales (n=37)	65%	30%	
Schedule for campaigns (n=38)	5%	90%	
Bar code scanning (n=37)	44%	51%	
Loyalty programme integration (n=38)	18%	71%	
Retail shelf sticker pricing (n=38)	50%	45%	
Customer analyses (n=39)	57%	41%	
Integrated point of sale (n=39)	86%	7%	
Log book for continuing professional development (n=38)	22%	75%	
Vacation roster (n=39)	21%	77%	
Staff roster (n=39)	21%	77%	
Tax returns (n=39)	54%	38%	
Financial forecasts (n=37)	30%	60%	
Credit control (n=39)	67%	255%	
Salary calculations (n=39)	33%	57%	
Budgeting (n=39)	51%	44%	
Accounting (n=41)	66%	32%	

Figure 12: Level of agreement to inclusion of features related to the pharmacy's internal processes in a future system
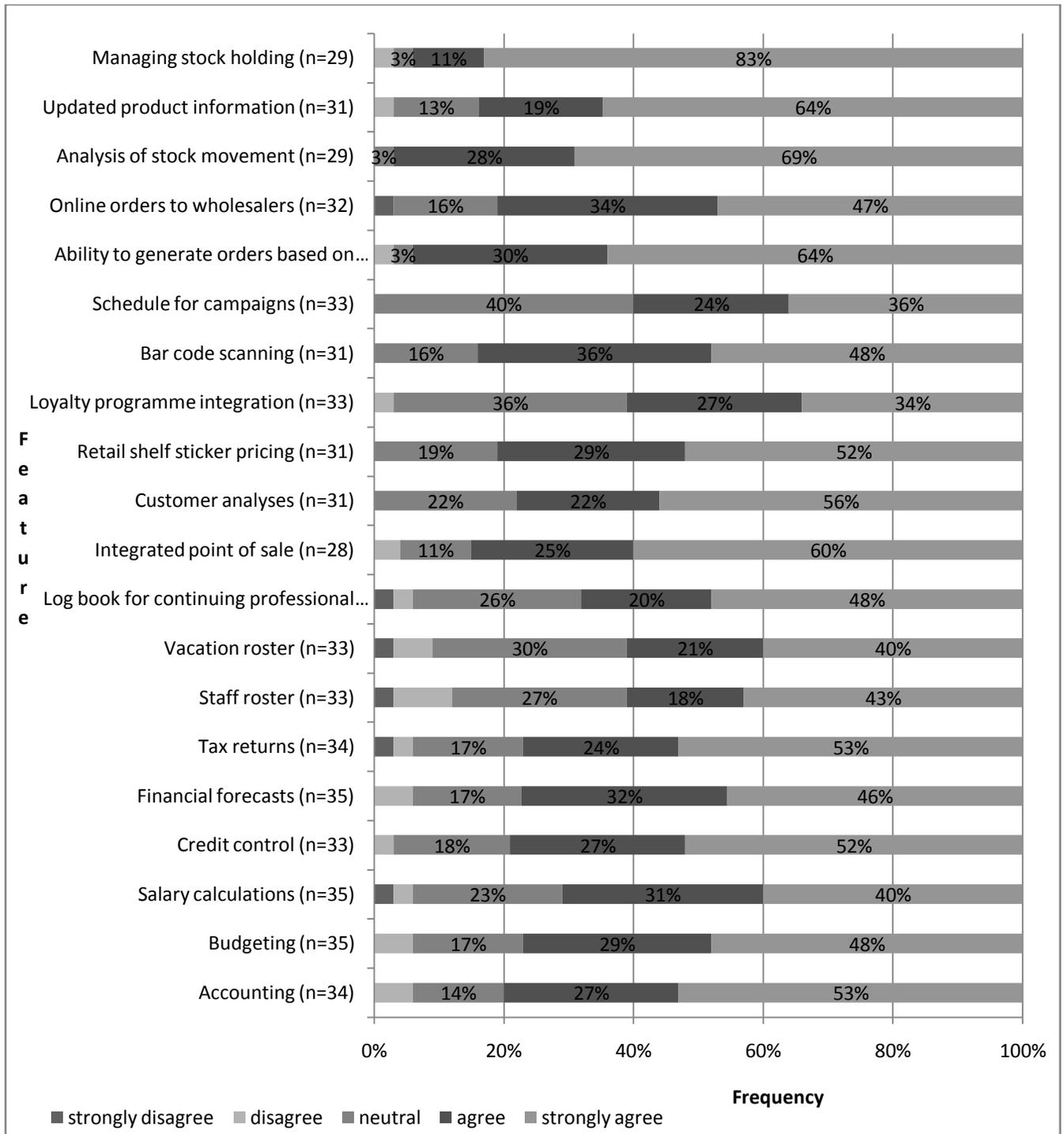
As indicated by figure above, 83% of the respondents strongly agreed to inclusion of stockholding management. Quite a number appeared skeptical as indicated by being neutral to the inclusion of schedules for campaigns (40% and customer loyalty integration (36%).

DISCUSSION

It is interesting to note that in current systems, features related to a pharmacy's internal processes such as financial and inventory management were more readily available than the those listed in other categories. However, features related to medication safety were given the highest priority by community pharmacists to be included in a future information system and those related to drug information and patient counselling were ranked second. Internal processes were ranked third which is a contrast to the current scenario where features related to professional and patient-care services are not widely available. This suggests that community pharmacists would like features that support their professional services to be more prominent in a future information system unlike the current situation.

A possible explanation for the current scenario is that the features and functionalities of current information systems are a reflection of the pharmacy owners or management priorities and not those other "staff" pharmacists. Similar findings were obtained in a study conducted in Finland by Westerling *et al* (2010), where community pharmacy owners prioritised logistic functions and basic cognitive pharmaceutical services functions.

The results of the study also indicate that highest priority was given to features community pharmacists were already familiar with. For example any features related to online purchase of products and marketing were given low priority whereas analysis of stock movement as an individual feature had the highest ranking.

It appears that information systems in community pharmacy were either developed without conducting proper systematic research or the development process is not iterative. In other words, once the systems were developed they were not revisited to see whether they still cater for the needs of community pharmacies. This position is supported by the degree of satisfaction reported. Less than half of the pharmacists were satisfied with their system and small fraction was very satisfied. Furthermore, there are no standards set by statutes that govern pharmacy practice in Zimbabwe such that it is up to the pharmacy owner to decide on which ICTs to use within their pharmacy. In this study, several pharmacies did not have internet connectivity and this can compromise patient safety since there is no ready access to up-to-date information. One pharmacy did not even have any computer which implies that information is handled manually. Such disparities are a reflection of a lack of standards with regards to information management and accessibility. This scenario more often than not leads to polarised practices that will negatively impact on good pharmacy practice (Westerling *et al.*, 2011).

This study also gives insight into whether or not patient care services are offered by community pharmacies in Harare. Community pharmacists were asked to specify patient care services (if any) that they offered in the pharmacy. An open-ended question was asked and a

definition of patient care services was given. Most of the respondents, however, listed a set of services that they provided ranging from blood pressure checks, glucose and cholesterol tests. These services are probably inconsequential to pharmaceutical care since the domain of pharmacy practice is expertise in medicines. In pharmaceutical care the pharmacist needs to take responsibility for the outcome of medication therapy; however the results of this study indicate that outcomes of therapy for individual patients are not being monitored. Appointment scheduling for patient counselling was given a fairly low rating. This failure to fully embrace patient centred care could be a reflection of the lack of strategic vision and direction for the pharmacy profession in Zimbabwe as whole.

CONCLUSION

There is a gap between the ICTs in use and the ICT needs of community pharmacies in Harare. Features offered by information systems currently in use cater mainly for the business element of community pharmacy practice despite the prioritisation of features that enhance professional services offered by community pharmacists themselves. High priority was given to features that the community pharmacists were familiar with. There was some degree of skepticism towards online features such as use of electronic prescriptions, online prescription refills and online purchase of pharmaceuticals by customers. There is lack of standardisation of ICT use in community pharmacies as evidenced by the use of different computer systems between pharmacies, lack of internet connectivity in some pharmacies and use of manual information systems. It is up to the community pharmacy owner(s) to decide what suits their business. Patient care services reported to be offered by community pharmacies are not holistic and therefore pharmacists cannot assume responsibility for treatment outcomes as is required by patient-centred care with the current practices. The limitation of this research is that it focused on patients in an urban areas with higher level of information literacy. There is a need to assess the challenges and opportunities that Information and communication technologies bring to patient-centred care in rural areas where people have less access to information literacy and information and communication technologies.

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