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What influences the implementation and sustainability of antibiotic stewardship programmes in hospitals? A qualitative study of pharmacists' perspectives in England

Teerapong Monmaturapoj[1], Jenny Scott[1], Paula Smith[2], and Margaret C Watson[3]

[1] Department of Pharmacy and Pharmacology, University of Bath, Bath, UK

[2] Department of Psychology, University of Bath, Bath, UK

[3] Strathclyde Institute of Pharmacy and Biomedical Sciences, University of Strathclyde, Glasgow, UK

Correspondence to Teerapong Monmaturapoj, Department of Pharmacy and Pharmacology, University of Bath, Bath, BA2 7AY, UK; tm853@bath.ac.uk

Abstract

Objectives: Antibiotic stewardship programmes (ASPs) are essential in hospitals to address antibiotic resistance and pharmacists are key agents in these programmes. This study explored pharmacists' perceptions of factors that influence the implementation and sustainability of hospital-based ASPs.

Methods: Semi-structured interviews were conducted with hospital ASP pharmacists face-to-face or by telephone. NVivo12 software was used to collate and organise the data grouped within codes. Thematic analysis was undertaken using inductive and deductive approaches to produce overarching themes.

Results: Thirteen pharmacists from 13 hospitals were interviewed. Four main themes were identified: (1) 'organisational culture' which highlighted the importance of strong local clinical leadership to help achieve organisational buy-in and address resistance among physicians or clinical hierarchies; (2) 'national influences' including networks, guidelines, and incentive

schemes which were considered to be a driver to bring about changes across organisation; (3) 'continuous monitoring with feedback data through direct communication'; and (4) 'resources' which indicated the need of information technology and dedicated personnel with protected time to support ASPs. To illustrate, theme (1): the majority of participants emphasised the importance of strong local clinical leadership to create a culture supportive of ASPs: *"In our Trust we do have comprehensive ASPs because we've got a very supportive consultant leading the ASPs…other colleagues at their level can help us engage with other clinicians and specialities as well."*

Conclusions: This is the first study to identify the importance of national influences in contributing to the successful development and maintenance of hospital ASPs. Interventions and strategies should operate at different levels - national, organisational, team, and individual - to optimise the likelihood of effective ASPs.

Keywords: (1) antibiotic stewardship, (2) antibiotic resistance, (3) hospitals, (4) pharmacists, (5) qualitative research

Introduction

Despite evidence of the clear benefits of antibiotic stewardship programmes (ASPs)[1-2], a global ASP survey including 660 hospitals in 67 countries found that only half of these hospitals had ASPs.[3] While perceived challenges of the programmes include lack of resources and lack of prioritisation within governance[4-5], there are increasing calls to identify factors that influence ASP success, including the most effective methods of implementation.[1,2,6]

Pharmacists play a vital role in ASPs by introducing and delivering strategies to optimise antibiotic use, as well as monitoring and reporting ASP performance to achieve programme

goals.[7-9] However, there is limited data of pharmacists' perceptions regarding how hospital ASPs should be developed and improved. As such, the aim of this study was to explore pharmacists' perceptions of barriers and facilitators that influence the implementation and sustainability of hospital-based ASPs.

Methods

Study design and sample

Semi-structured interviews were conducted with hospital ASP pharmacists who were members of the South West Antibiotic Pharmacy (SWAP) Group, an antimicrobial resistance network in England.[10] Potential interviewees were identified by a researcher (TM) during a SWAP group meeting, and a study information sheet was emailed to these individuals.

Data collection

The interviews were conducted face-to-face or by telephone using a topic guide (*Supplementary file*) informed by the literature and reviewed for content validity by the research team. The guide was piloted with two non-participating hospital ASP pharmacists and refined upon their suggestions. The interviews explored pharmacists' views and experience of barriers and facilitators to the implementation and sustainability of ASPs in their settings. All interviews were conducted by one researcher (TM) and were audio-recorded. Data collection and analysis were conducted concurrently. The final sample size was determined by the adequacy of data in terms of data richness and complexity[11] around factors influencing hospital ASPs which were compared with the existing literature and new additional insights from the interviews.

Analysis

All interviews were transcribed verbatim and accuracy checked against original audio-recordings. The interviews were analysed thematically using inductive and deductive approaches to produce the codes and the themes.[12] The codes were informed by the literature and interview content. The first transcript was reviewed and coded independently (TM, JS, and MW). Similarities and differences in coding were discussed and the initial coding framework was agreed for single coding (by TM) of the remaining transcripts. NVivo12 software was used to aid data management. The development and refinement of codes within the coding framework was regularly discussed by the research team until the end of the coding process. A thematic map was used to draw out main themes and sub-themes.[13] In the final analysis, all researchers reviewed and agreed the findings. This study is reported to reflect the Consolidated Criteria for Reporting Qualitative Research (*Supplementary file*).[14]

Ethical approval was given by the Research Ethics Approval Committee for Health of the University of Bath (EP 18/19 026).

Results

Thirteen interviews were completed with individuals from 13 hospitals between June and September 2019. Eleven interviews were face-to-face, and two were conducted by telephone. Each interview lasted approximately one hour. Most participants (*n=11*) worked in teaching hospitals and had ≥ 15 years of post-registration experience (range 7 to 30 years). The participants had a wide range of experience working in ASP roles, ranging between 2 and 19 years, and spent between 15 and 37.5 hours per week on ASP activities.

Four main themes were identified, including organisational culture, national influences, communication, and resources. The following sections provide a detailed description of each theme in hierarchical order as mentioned by participants.

'Organisational culture'

This theme was mentioned by most participants as being necessary to achieve ASP success. In the context of this study, organisational culture includes shared beliefs, values, and ways of interacting that influence individual or group behaviour of healthcare personnel to engage, support, or hinder the development or maintenance of ASPs. The theme was divided into three subthemes, including organisational buy-in, relationships and teamwork, and conflict management.

Organisational buy-in

Achieving organisational buy-in was described as an important aspect in the initial development, long-term sustainability, and driving improvement of ASPs. It could enhance engagement across the whole organisation with the programmes. Participants emphasised the importance of support from strong influential clinical leaders in achieving acceptance across organisation. Clinical leadership involvement was also important in achieving engagement with junior doctors who prescribed most antibiotics, resulting in improved appropriate antibiotic use.

> *"Some areas in our hospital that are really good in [antibiotic] prescribing…the seniors in that area are keen on ASPs…they sit on our stewardship governance*

group…[their] junior doctors are more engaged…that makes all the differences to how the junior doctors prescribe" [PT005]

Participants also emphasised the importance of leadership to help address concerns about challenging clinical hierarchies and physician resistance.

"Without the high-level sponsorship…the consultants are going to say "if I don't do it, what's going to happen to me?"...I think without that…you are fighting uphill all the time." [PD012]

Education was perceived to help promote awareness of the importance of optimising antibiotic use, creating a foundation for buy-in and multidisciplinary engagement with ASPs. Conversely, lack of regular education sessions for healthcare workers was considered to be a major barrier to multidisciplinary involvement in these programmes.

"We do need more on the ground education to keep it [ASPs] in people's minds …if we could do that…it would improve engagement of people [with ASPs] here" [PT010]

Relationships and Teamwork

While core ASP teams included infectious disease physicians, medical microbiologists, and antibiotic pharmacists, participants believed that close relationships with leaders in other specialties and professions could send a strong signal about the importance of responsible antibiotic use. In addition, the importance of building relationships with non-ASP ward staff, including physicians, nurses, and pharmacists, was emphasised. Participants described the

value of multidisciplinary working to promote ownership of ASPs, ensure a multidisciplinary approach, and improve engagement across the organisation.

> *"The key success to me is to get people from various areas to work with you as a team…everybody has different views on how you can improve things and how you can get things embedded in practice..." [PT009]*

Participants explained strategies for developing relationships and teamwork including demonstrating the clinical impact of ASPs.

> *"We showed the surgeons that we could get patients from intravenous to oral [antibiotics] sooner…we could get patients out [from hospital] sooner…they are now very keen and engaged to do a ward round with us" [PT009]*

Participants considered multiple, face-to-face interactions between ASP team members and ward staff to be more effective in relationship building than remote interactions. Clinical ward rounds, team meetings, and regular ward visits by ASP staff acted as reminders to colleagues about ASP-related activities and were perceived to contribute to the maintenance of successful ASPs.

> *"Being a high visual presence [of ASP team] where people are making decisions [about treatment] is one of the most important things…that's all sort of maintaining and reminding people that guidelines exist, review [antibiotics] is required" [PD006]*

Conflict management

Participants confirmed that antibiotics were not always prescribed in accordance with hospital guidelines. These inconsistencies were sometimes attributed to the influence of senior medical staff.

> "*The consultants who had a lot more experience and sometimes they go off guidelines as they feel that something, they don't like to do it…they want to treat it a different way*" *[PT008]*

To address the conflict between using hospital guidelines and senior medical staff's experience, participants identified reasons why those guidelines did not apply to their patient as there were some clinical situations when alternative antibiotics could be used instead of recommendations in the guidelines. Participants were sometimes able to engage with the ASP lead (a medical microbiologist or an infectious disease physician) to approach senior medical staff about their non-compliance with the guidelines and use evidence-based medicine or local antibiotic resistance data to inform and change their practice in prescribing.

> *"I did have locum consultants…they gave Tazocin® [board spectrum antibiotic] for everybody…our lead [microbiologist] and I had a meeting with them…we explained and talked about the evidence based medicine…it doesn't happen anymore" [PT005]*

Participants also mentioned the value of coalition building to develop local ownership of using hospital guidelines.

"We had our own plastic surgeons and they just liked to do their own thing…they didn't follow the guidelines…we asked them to join us to make those guidelines…we met them several times and finally had guidelines that they were comfortable with" [PT003]

'National influences'

The impact of national influences was perceived to contribute to the success of hospital ASPs. The establishment of national ASP or antimicrobial resistance networks allowed individuals to share experiences in managing ASPs, and included several dedicated open-access platforms which were able to help other different healthcare settings to learn and improve ASP activities.

"Having [the] national antimicrobial resistance network is really useful…it keeps you informed…we share ideas and resources…we communicate national data…it's very collaborative and supportive" [PT010]

National guidance was considered an effective tool to give participants authority to convince other healthcare personnel in their settings of the necessity to comply with recommendations. The integration of national guidance within reporting systems for monitoring guidance adherence helped to raise awareness of ASPs amongst hospital leadership. These individuals were perceived to be key local champions who enabled programmes to be continuously improved as a result of local performance data being benchmarked against national figures. Participants also emphasised the need for a national strategy to standardise the operation of hospital ASPs.

"I think national guidance does make a difference… it gives us clout and authority to say [with hospital leaders] that we have to do this [ASPs]… it sits very high on the Trust's agenda…I don't have trouble getting people involved because of this" [PT009]

National quality improvement schemes were also considered to be important in prioritising and maintaining ASPs, with the success of programmes deemed more likely if linked to financial incentives. Participants cited the "Commissioning for Quality and Innovation" (CQUIN) to be a positive influence as it brought the attention to hospital leaders and provided an opportunity for organisation to focus on ASPs. CQUIN is a national payment framework in England which enables commissioners to reward healthcare providers by linking a proportion of the provider's income to the achievement of quality improvement goals.[15]

"CQUIN gives you the priorities and makes more noticeable amongst the Trust Board essentially…it does work from that point of view of getting support from senior management…if there's any country that is struggling [to implement ASPs]…I think it [CQUIN] would certainly help" [PT003]

'Communication'

A third key theme from the interviews was communication and it was identified as a determinant of ASP success. All participants used "audit and feedback" as the main strategy to optimise antibiotic use and support ASP activities. ASP team members (usually a pharmacist) typically collected audit results and disseminated them to prescribers, senior clinicians, and the hospital administrative board. Aggregated data was considered as an effective tool to inform

improved antibiotic prescribing and to demonstrate ASP impact which then facilitated ongoing leadership support.

> *"You need outcomes to show to have some teeth…so those men [Trust Board] can see this [ASPs] is useful...this is worth investing in definitely…once you've got the data and people can see there's an impact…you can then go onto the next area" [PT010]*

Effective communication structures were considered necessary to disseminate ASP information. Participants distinguished between communication through intra-organisational networks and face-to-face contact.

> *"I find it's very useful for me is to go out and communicate with their own [each prescriber group] meeting…you can discuss and tell them how they're performing against the metrics…I've got lots of feedback from them which is absolutely invaluable" [PT013]*

'Resources'

The fourth key theme identified in this study was resources. Resources in the form of information technology and personnel were cited to be important to effective ASPs.

Information technology

Electronic (e-) prescribing was considered to facilitate the implementation of ASPs in terms of patient identification and prescription checking (indication and duration) of restricted antibiotics, however, only few participants had access to this technology. Access to e-

prescribing was also perceived to save time for ASP team members which would help them to focus more on physical ASP activities, such as clinical ward round.

> *"If we had e-prescribing systems…we could spend the time on the wards with the clinical teams without having to spend all this time looking through notes and going around collecting that sort of data…it's the one that I'm looking for to see changed" [PD012]*

Personnel

Insufficient staff and lack of dedicated time for ASP duties were identified as personnel-related barriers to delivering ASPs. Participants suggested that this lack of resource meant tasks such as "audit and feedback" could not be undertaken, thus impeding the continuous development of ASPs.

> *"We do need more antibiotic pharmacists and microbiologists…whereas we get asked to do more and more with fewer and fewer resources…so things fail and stop happening…if you stop doing audits to [present with] the [antibiotic] governance meeting…that's the main problem to maintain ASPs." [PT008]*

Strategies to address these challenges included having protected time for specific ASP activities which required active support from hospital leadership, engaging with ward pharmacists, or identifying ward 'champions' such as nurses. Engagement with ward staff meant that ASPs could become embedded into daily patient care and thus enhancing the sustainability of these programmes.

"Our pharmacists on the ground are the ones who review drug charts everyday… our compliance [with guideline] is always above 90%…they're key drivers for pushing this" [PD007]

Discussion

This study provides insights into the experiences of pharmacists regarding the implementation and sustainability of ASPs in hospitals in England. The results illustrate that successful ASPs in hospitals are built on a range of factors. To facilitate the success of ASPs at an organisational level, the findings indicate the need for support from strong local clinical leadership, as well as effective mechanisms of monitoring and reporting ASP performance. The participants in this study suggested that leadership engagement and the provision of feedback to reflect the necessity or the impact of initiatives were essential for achieving organisational buy-in, the foundation of successful and sustainable ASPs.[4,5,16,17] These findings are consistent with other studies which investigated factors related to the implementation of infection prevention practices.[18,19] Studies have shown that participation in collaborative efforts which align clinical leadership and provision of feedback data concerning local infection rates, helped to address resistance to change among staff.[18,19] Strong clinical leaders are perceived as locally respected change agents and experts in the subject-matter.[8,19] Their involvement has been shown to be related to the success of several hospital initiatives.[18,20]

There are opportunities to drive development and improvement of ASPs beyond institutional levels. The establishment of national guidance that links with regulatory systems, such as quality indicators, illustrates a promising strategy for successful ASPs. Using such regulators to reflect performance against standards provides an increased sense of accountability to initiatives among staff and organisations.[21] The participants in the current study also suggested

that the use of financial incentives that rewards quality improvement can be an effective strategy to encourage engagement with ASPs. The achievement of quality-related targets provides additional resources and thus enhances the capacity of healthcare settings to initiate other ASP strategies which improve the quality of care. Our finding that ASPs need to be adequately resourced to be effective has been reported elsewhere.[3-5,16] There is evidence that countries which combine quality improvement with financial incentives have the highest rates of ASP implementation.[3,22] Furthermore, the introduction of financial rewards has been successful in reducing antibiotic use for uncomplicated self-limiting infections in primary care.[23] A positive influence of rewards on performance has been reported as a motivational driver to overcome organisational inertia, and to help change local practice and organisational culture by shifting priorities and over time influencing values and norms.[24-25]

This study concurs with previous research which has found that resource constraints remain a universal barrier to ASPs.[3-5,16,17] There are strategies which may help overcome this challenge. Provision of feedback to leadership about ASP performance can be an effective strategy for receiving regular support and possibly compensating for a lack of resources.[7,8,26] From our findings, it appears that demonstrating outcomes which links with externally driven targets (e.g. CQUIN goals) along with other patient-related measures, is likely to increase leaders' attention and buy-in. The results in this study also suggest that multidisciplinary collaborations can address some of resource limitations, such as a lack of personnel. To promote sustained engagement with the wider healthcare workforce, our findings demonstrate the need for direct communication using audit and feedback. This technique is a recognised educational tool and a way to demonstrate the credibility of the programmes.[7,8]

Recommendations for practice

Hospitals need to incorporate national initiatives to ensure effective support and scale-up ASP interventions. We also recommend that hospitals seek support from strong, influential, clinical leaders as key local champions and provide feedback regarding the impact of ASP initiatives. These two elements are likely to influence the success of hospital ASPs. ASPs may take time to derive noticeable improvements and require substantial resources to achieve their desired effect.[17,26] Local clinical leadership can be an effective driver in enacting more immediate and sustainable changes which result in successful programmes even where government-led ASPs are absent.

Limitations

There are limitations to the methods and interpretation of this study. Only hospital ASP pharmacists from one region were interviewed; other non-pharmacist ASP members or healthcare professionals may hold different opinions. Professional, cultural and healthcare contexts may also differ across regions. Most participants worked in teaching hospitals, therefore, their opinions may not reflect those of personnel from non-teaching institutions which may have different challenges in building and maintaining ASPs. Further exploration of factors which influence the success of ASPs would benefit from the inclusion of additional geographical regions and the inclusion of other healthcare professionals' perspectives.

Conclusions

The importance of national initiatives (networks, guidance, and incentive schemes) was a novel finding of this study of factors which contribute to the successful implementation and sustainability of hospital-based ASPs. The introduction of national strategies should be aligned

with support from local clinical leadership, adequate resources, and effective mechanisms for monitoring and feedback.

What this paper adds

What is already known on this subject

- ASPs in secondary care are multifaceted and their success is dependent upon several factors.
- Barriers to the adoption and the success of hospital ASPs include lack of financial and human resources, and a lack of prioritisation within organisations.

What this study adds

- National influences facilitate the success of ASPs in hospitals.
- Support from strong local clinical leadership and provision of feedback are essential components at an organisational level in achieving successful ASPs.

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