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Factors influencing application of behavioural science evidence by public health decision-makers and practitioners, and implications for practice

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ABSTRACT

The National Institute of Health and Care Excellence (NICE) in the UK recommends behavioural science evidence underpins public health improvement services. In practice, level of implementation varies. This study is the first to explore factors affecting use of *behaviour*-specific evidence by public health decision-makers and practitioners for design and delivery of health improvement services. Twenty semi-structured interviews were conducted, along with a review of the commissioning cycle with public health decision-makers and practitioners across a range of health improvement fields (e.g. weight management). Interviews were informed and analysed using the Theoretical Domains Framework (TDF). Limited comprehension of behaviour change, challenges identifying specific behaviour change strategies and translating research into practice were prevalent. Local authority processes encouraged uptake of evidence to justify solutions as opposed to evidence-driven decision-making. Some decision-makers perceived research evidence may stifle innovation and overwhelm practitioners. Potential facilitators of research use included: ensuring uptake and implementation of evidence is compulsory within commissioning and its potential to show value for money. A strong belief in local evidence and achieving outcomes were identified as barriers to research evidence uptake. Social and environmental challenges included cultural, political, and workload pressures and journal article accessibility. Embedding behavioural science systematically into public health practice requires changes throughout the public health system; from priorities set by national public health leaders to the way in which relevant evidence is disseminated. Framing factors affecting use of behavioural science evidence using the TDF is helpful for identifying the range of interventions and support needed to affect change.

1. Background

The most prevalent causes of death and morbidity are attributable to non-communicable disease (NCD) which has been identified as due in considerable part to health-related behaviour (e.g. smoking, poor diet, lack of physical activity) (Glanz and Bishop, 2010). Yet, health behaviour change evidence is not typically forefront in public health departments' health improvement service planning and delivery. Instead, the focus is typically on epidemiological and clinical evidence relevant to communicable and NCD (Pine and Fletcher, 2014).

1.1. Evidence informed decision-making and public health

To improve population health, greater adoption of evidenced-based interventions is recommended (Brownson et al., 2009). There is therefore an impetus for public health professionals to use evidence-informed decision-making (EIDM) (Armstrong et al., 2014; Yost et al., 2014). EIDM comprises systematic processes integrating scientific evidence with contextual factors such as local relevance, available resources and community and political preferences to inform decisions related to policy, programmes and practice (Yost et al., 2014; Armstrong et al., 2013; Peirson et al., 2012). EIDM benefits public health through more efficient use of resources, decision-making at both community and system levels, and greater chance of effective

Abbreviations: BCTs, behaviour change techniques; COP, communities of practice; EBPH, evidence based public health; EIDM, evidence informed decision making; NICE, National Institute for Health and Care Excellence; NCD, non-communicable disease; TDF, Theoretical Domains Framework; WHO, World Health Organisation; PPI, patient and public involvement; TUPE, transfer of undertakings (protection of employment)

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programmes being implemented (Brownson et al., 2009; Yost et al., 2014; Meagher-Stewart et al., 2012; van de Goor et al., 2017).

In this paper we focus on public health decision-making, within the context of service commissioning, and how it is informed by research evidence from the behavioural sciences. Behavioural science can be defined as an interdisciplinary approach to the study of human behaviour (Glass and McAtee, 2006) encompassing disciplines including psychology, sociology, anthropology and economics. We focus particularly on health behaviour change theory and evidence as this reflects our expertise but are cognisant of wider relevant literature.

Underpinning interventions with theory is a key recommendation of the UK Medical Research Council's framework for developing and evaluating complex interventions (Craig et al., 2008). This is supported by systematic reviews suggesting that health behaviour change interventions are more effective when underpinned with theory (Webb et al., 2010; Cole-Lewis and Kershaw, 2010). Within the context of public health, such approaches offer the opportunity to underpin the design and delivery of health improvement services with content derived from evidence about what works to change relevant behaviours. Despite pressure to demonstrate public health services are evidence-based (Orton et al., 2011; Milat et al., 2015), requirements to draw on this type of evidence are typically quite cursory.

1.2. The local authority context

In England, where this research was conducted, public health departments are housed within local authorities, subject to local government regulations and answerable to elected council members. They are largely focused on commissioning of services by other providers from the private, public sector or third sector. Because each local department operates independently from others they are often configured in different ways but are typically divided into teams that deal with Health Protection, Health Improvement, and Health Intelligence.

1.3. The complexities of public health research evidence

Effective public health programmes must support behaviour change at individual, organisational and community levels (Glanz and Bishop, 2010). Whilst the science base is developing, it is unwarranted to refrain from using the existing evidence base when designing and delivering health improvement interventions (Brownson et al., 2009). International organisations (e.g. World Health Organisation) support the need for underpinning population-focused programmes with behavioural science evidence, yet the degree to which evidence-based approaches are implemented varies (Milat et al., 2015). Within the UK, NICE produces public health guidance informing commissioning and practice (Orton et al., 2011). Public health guidelines [PH6] and [PH49] (https://www.nice.org.uk/Guidance/ph6, n.d.; National Institute for Health and Care Excellence, 2014) focus on behaviour change approaches, however, genuine impact of this guidance remains unclear.

1.4. Active ingredients in health behaviour change interventions

According to Brownson and colleagues (Brownson et al., 2009), a fundamental component of EIDM (referred to as evidence-based public health (EBPH)), is the translation of effective interventions to new populations. To do this, the authors maintain that practitioners need to identify the most effective components or 'active ingredients' of an intervention (Brownson et al., 2009). Within behaviour change science, these 'active ingredients' have been defined as 'behaviour change techniques' (BCTs) and represent the oberservable and measurable components that directly bring about change in a target behaviour (Michie et al., 2014). For example, BCT taxonomies (see Abraham and Michie, 2008; Michie et al., 2011) have been used to specify BCTs associated with more effective childhood weight management interventions such as: Prompt specific goal setting; Self-monitoring; Instruction on how to perform the behaviour; and Plan for social support (Curtis et al., 2015). Decision-makers' understanding and practioners' use of such BCTs in public health services remains unexplored.

1.5. Previous research investigating barriers to research evidence uptake

To date, the majority of studies investigating barriers to research evidence uptake have focused on clinical, health services and health policy evidence (Armstrong et al., 2013; Mitton et al., 2007). Previous research has not looked at behavioural science research evidence uptake, nor included public health practitioners. This paper focuses on decision-makers (defined as those that make management decisions about public health services including financial and delivery aspects) *and* practitioners, (defined as those that make decisions pertaining to individual service users) **(Abraham and Michie,** 2008**).** We focus on health improvement services targeted at people identified as having lifestyle-related health-problems, as these require greater emphasis on health behaviour change than health promotion activities (e.g. tier 2 weight management services, stop smoking services, sexual health services) and are a major remit of public health departments in the UK. In line with Armstrong and colleagues (Armstrong et al., 2011), we refer to behavioural science research as research drawn from evaluations assessing the effects of interventions on health outcomes. Until now there has been limited use of theory to understand influences on public health decision-makers and practitioners' behaviours. Adopting a theoretical approach allows the generation of replicable methodologies for classifying factors influencing staff behaviour and providing potential 'targets for knowledge translation interventions' (Bonetti et al., 2010: 1).

1.6. Theoretical underpinnings of the research

The current research utilises the Theoretical Domains Framework (TDF) (Francis et al., 2012; Cane et al., 2012) which unites theoretical constructs from multiple behaviour change theories. The TDF classifies 14 domains including 'Knowledge', 'Skills', 'Beliefs about capabilities' and 'Emotion', known to influence behaviour and offer potential targets for change (Steinmo et al., 2016). The TDF has been used to study a range of health professionals behaviours (Fuller et al., 2014; Patey et al., 2012; Curran et al., 2013; French et al., 2012; Bussières et al., 2012) and offers 'an inclusive, rather than selective, approach to exploratory research in the field of implementation' (Francis et al., 2012: 6). Exploratory, qualitative research is appropriate where existing research data are limited and the TDF is used in the current research to address the question, 'which theoretical domains conceptualise the factors that influence staffs' use of behaviour change evidence for the commissioning, design and delivery of public health improvement programmes?'.

In addition, we considered, 'how do these findings map to stages involved in commissioning such programmes, and where might this provide opportunities to change practice?'

2. Methods

2.1. Study design

This was an interview-based qualitative study. Ethical approval was granted by Coventry University. Interviews (vs focus groups) were chosen to avoid the influence of others' views (Reeves et al., 2008) previously highlighted as important (Wye et al., 2015). A further interview with a decision-maker and consultation of commissioning documents were used to map the commissioning process for weight management services. The account was added to and verified by another decision-maker.

2.2. Case site selection

Interviews were conducted with public health employees from three local authorities in the UK Midlands.

2.3. Procedure

A semi-structured interview topic schedule (see Supplementary Table 1) was developed to explore the relevance of TDF domains on to behavioural science research evidence use. Drafts were devised, reviewed and piloted before a final version was implemented. The interviews took place between March 2016 and June 2016 and facilitated by one researcher (KC). Interviews were conducted at the local public health offices, or with practitioners, on their premises. Interviews lasted 30–45 min, were audio recorded and transcribed verbatim.

2.4. Data generation and analysis

Each segment of data was deductively coded to one of the 14 TDF domains in NVivo. To assess reliability, a subset of 10% of transcripts were double-coded by another researcher (KB). KC and KB separately conducted a thematic analysis to identify any sub-themes within and across the domains (e.g. Public health culture, Political environment). Eleven TDF domains were identified by both researchers. There was an agreement on 9/11 of these domains. This led to a Cohen's kappa of (0.84). Disagreements were discussed and resolved. No evidence was categorised within the domains of 'intention', 'goals', or 'optimism'. The commissioning cycle steps were mapped against the data to identify opportunities for influencing change (see Table 1).

3. Results and discussion

3.1. Sample characteristics

Public health staff included ten public health commissioners, one public health consultant (decision-makers) seven service providers, (practitioners) (see (Armstrong et al., 2011)); and two public health officers (officers) (N = 20). These staff worked in a range of public health improvement areas including sexual health (n = 3), weight management (n = 3), wider determinants (n = 2), smoking (n = 1), and children's services (n = 2). Practitioners worked in weight management (n = 6) and smoking cessation (n = 1).

3.2. Summary of findings

Analysis identified a number of influences on behavioural science research uptake. These are presented within their assigned TDF domains and numbered as in Supplementary Table 1. The data drawn on to understand the commissioning cycle was translated into a series of steps. These were mapped to the qualitative data and opportunities for embedding evidence identified (see Table 1).

3.3. Knowledge

The majority of decision-makers reported a lack of understanding about 'behaviour change' and research evidence from this field:

> *There will be some real challenges around just, I think, some fairly basic understanding of what behaviour change is.*
>
> (Decision Maker, P19)

Regarding knowledge of specific behaviour change strategies (referred to as BCTs), responses indicated that whilst decision-makers had limited knowledge, practitioners use BCTs without realising or documenting them:

> *Actually they're implementing baby behaviour techniques without even realising it so they're not documenting it 'cause they don't know what it means.*
>
> (Practitioner, P13)

Whilst the standardisation of terms used in health behaviour change interventions such as the 'BCT taxonomy V1' (Michie et al., 2013) provide a common language and a tool to support consistent use of effective strategies in interventions, it seems knowledge mobilisation is still needed.

3.4. Skills

Both decision-makers and practitioners reported varying skill level with regards accessing research evidence due to the diversity of professional backgrounds within the workforce [see (Brownson et al., 2009; Armstrong et al., 2013; Orton et al., 2011b):

> …it depends on your background doesn't it to what sort of knowledge or skills you have in that particular area. If you haven't I think it could be quite a challenge.
>
> (Practitioner, P15)

3.5. Memory, attention and decision-making processes

There is growing consensus that programmes should be underpinned with an understanding of relevant target behaviours within the contexts they occur (Glanz and Bishop, 2010; Michie et al., 2014). This can include the behaviours targeted within a service (e.g. healthy eating) and behaviour associated with actually using the service. Findings indicated that such behaviours were rarely the focus of attention during commissioning.

> *I don't always think about behaviours as the first things…for example sex workers don't like accessing mainstream services and had we thought about [that] beforehand we could have built something into the health needs assessment specification that said understanding what drives or doesn't drive particular behaviours to help us reach but we didn't.*
>
> (Decision-maker, P12; supported in Table 1, steps 1–6)

In addition, findings indicated that decision-makers pay attention to local data over-and-above academic evidence as identified in previous research (Armstrong et al., 2014; Wye et al., 2015).

> *Local evidence is paramount. So that's very important because that's what influences what would happen on the ground.*
>
> (Decision-maker, P1)

More than one decision-maker acknowledged that evidence is considered in hindsight, and used to justify decision-making rather than inform it which has also emerged in extant literature (Yost et al., 2014; Orton et al., 2011; Wye et al., 2015).

> *It should be at the beginning but sometimes it's an afterthought.*
>
> (Decision-maker, P12; supported in Table 1; steps 3–4)

> *I would prefer to be in a position where I'm being more pro-active in terms of this is evidence that has come out now how am I going to act on that whereas at the moment it's these are the services that I commissioning how am I going to use the evidence to support that if that makes sense?*
>
> (Decision-maker, P7; supported in Table 1, step 3)

3.6. Behavioural regulation

Participants reported that there were no formal systems in place to monitor the use of evidence within commissioning, which supports previous research noting this (Armstrong et al., 2013).

> *No, not that I know of, but that would probably be quite good.*
>
> (Officer, P3)

Table 1
A retrospective map of the commissioning process for weight management services aligned against opportunities to apply behavioural science evidence.

Order of events	Opportunities to embed behavioural science evidence	Alignment with commissioning cycle
Pre-decision to tender		*Assessing needs & deciding priorities*
1. Deciding whether physical activity (PA) is a priority for local authority: is it aligned with Health and wellbeing strategy and other priorities, and the Directorate's plans?	Opportunity to conduct own behavioural science review or gather existing systematic reviews asking relevant research questions about content of effective interventions. Could commission external expertise if internal staffing cannot meet need.	
2. Capacity planning with a view to tender: estimating and planning the time and resources for whole commissioning process; time to do the systematic review, gather intelligence, providers		
3. F2[a] – conducted a systematic review on exercise on referral focussed on evidence that it improves health outcomes. **Using the evidence to justify decision-making not inform and not focussed on behavioural science evidence* i.e. *how to get people to do the physical activity*.		
4. Commissioner – reviewed the weight management (WM) evidence (Consisting of Obesity guidance, NICE, National obesity website, commissioning a reviewing xxx university's systematic review of WM programmes, attending relevant events and conferences) **Reviewing evidence on weight management programmes after and not using this to determine specific target behaviours*.		
5. Procurement Plan and risk register (making sure any risks to the council are identified early on)		
6. The intelligence team analysed the need around the county's population – included national and local lifestyle surveys – countywide		
7. Extensive Service Review: Outcomes from existing service – cost, completion rates, health outcomes, identifying where the gaps were based on F2 systematic review report,		*Reviewing service provision*
8. Evaluation of [Name] by [Name] University – conducted research on health outcomes, focus groups, and consultation with health professionals		
9. Review of National Child Measurement Programme (NCMP) rates		
10. Weight Management on referral – poorly done, not consulted on		
11. Options appraisal – Recommendations paper based on evidence and information gathered so far		
12. Public Health Director's agreement to tender and proposal of budget		
13. Budget based on a review of the costs on pilot services and calculation of this countywide		
14. Steering group set up with finance lead, legal lead, procurement lead, commissioner		
15. Equality impact assessment – priority groups – race, age, gender – risk assessment to make sure you have considered all these elements before tender and this also informs the service specification		
16. Privacy Impact Assessment is conducted		
17. Approval required from portfolio holders (democracy, hierarchies in the council, e.g. Public health directors, then portfolio group, then cabinet) as over threshold of £500 k (contract standing orders)		
18. Then approval report		
19. Inform relevant stakeholders for the need for approval	Opportunity to plan engagement with potential service providers around behavioural science knowledge and skills needs as part of market testing; offer training and support from those with skills and expertise in behavioural science during market testing; could include workforce training, support to re-design behavioural science content of proposed services and ongoing supervision during service implementation if successful.	*Shaping structure of supply, planning capacity and managing demand*
20. Wait for response from leader		
21. Get response and make any amends required		
22. Once approved, prepare for market testing (procurement send an invitation out on contracting system and ask them to attend market testing event)		
23. Conducted GP consultations to find out their views		
24. Marketing testing event: Ten providers came forward and procurement showed them the process of how to apply. Commissioner talked about the service and took questions. Market testing: This gives potential service providers (SPs) an open forum to hear what commissioners are proposing to help them to make decision on whether they should bid or not for the work. Market testing is about building relationships. **This is where the commissioners could challenge the market and set out their case for expectations around use of behavioural science evidence, understanding the behavioural targets for services and use of behaviour change in what is delivered*.		
25. Specification development – collating all the information gathered so far. Use of a standard the council template or adapt national specification if available.	Opportunity to ensure that the behavioural science requirements for the content and delivery of services are expressed clearly within the specification documentation with guidance on where to seek input and advice on behavioural science. Opportunity to ensure that the evaluation questions for assessing bids includes clear criteria for judging inclusion of behavioural science evidence base and include behavioural scientist on the	*Designing services*
26. Consult on spec – with other colleagues and stakeholders (social care, GPs)		
27. Develop evaluation questions for tender, decide on how long the contract will be for, how to split between finance and quality as part		

(*continued on next page*)

Table 1 (*continued*)

Order of events	Opportunities to embed behavioural science evidence	Alignment with commissioning cycle
of tender evaluation (Finance was given priority over quality). 28. Identify a panel to evaluate the tenders – stakeholders (two school nurses) 29. Training/briefing of evaluation panel members 30. Procurement sent out an expression of interest - certain length of days has to go out for 31. Procurement sent out an invitation to tender (ITT), as part of this process some councils do a pre-qualifying questionnaire asking about their credentials 32. Any service who has expressed an interest in this tender, is then invited to tender. They are also sent TUPE forms. 33. Tender sent out for 90 days, includes spec and compliance docs i.e. insurance etc. (procurement send these out). Organisations can ask for clarification on certain aspects and these are all logged so all providers can see it 34. When tender closes, tenders are evaluated against the specs/ questions, meant to allow for creativity and innovation and social return, e.g. How would you deliver BC model in this service? 35. Procurement send a template to the evaluation panel to score each tender 36. This was carried out separately but can be done in pairs 37. Evaluators may have some clarifications they require from the bidder, all compiled on a spreadsheet which procurement sent out as questions to different people 38. Invitation sent to key bidders to present their bid and ask and answer questions 39. Award made to successful bid	evaluation panel. Opportunity to include behavioural scientist on the evaluation panel	
Post award		*Managing performance*
40. Contract which includes payment schedule is sent out by procurement for signature by successful bidder, then signed by THE COUNCIL, then signed copies are stored on a system called INTEND, any updates are saved on here from this day forward 41. Commissioner manages the transition period from one provider to another 42. New service commences, new provider is mobilised and service is implemented, for fitter futures there was a launch event 43. Contract/performance management; meeting key performance indicators (KPIs), collect all info here and feedback to commissioner. Exception reporting is managed by commissioner, steering group set up to oversee that the service is performing as it is required to do.**No fidelity checking.* 44. KPI is quarterly and this governs success of the service. 45. Continuous monitoring review and any changes made through a contract variation (quite common), any feedback is taken on board and used to amend service 46. Set up a service quality review audit.	Opportunity to build in contractual requirements to report on how services are delivered (fidelity and quality assurance) as well as monitor outcomes Opportunity to support providers as they trial out new behaviour science based programmes. Opportunity to build in fidelity assessment and quality assurance indicators as part of key performance indicators (KPIs) Opportunity to assess the success of the approach taken to embed behavioural science and improve on the process for the next commissioning cycle.	

[a] F2 is a medical graduate in second year of postgraduate rotations – this includes Public Health where an individual selects this.

Failing to monitor the use of evidence-based information to inform decision-making has also been found in previous research (Armstrong et al., 2014). A tendency not to monitor programme fidelity was also acknowledged.

We don't look at sort of fidelity to the intervention as such.

(Decision-maker, P12; supported in Table 1, step 45)

Arguably, the impact of behaviour change strategies on population health cannot be assessed if we fail to track their use (Brownson et al., 2009). Documenting which behaviour change strategies/techniques are effective in practice would contribute significantly to understanding what works (Sniehotta et al., 2015).

Decision-makers and practitioners agreed that if the monitoring of practitioners' use of evidence-based BCTs were compulsory, this would support uptake.

We should and could look at building into our contract management meetings we could build into auditing so you could say once a year audit a particular part of your service so you can see how well behaviour change techniques is being used.

(Decision-maker, P7)

If it was built into the commission that's how everybody will do it, you know, if that's what you're measured on then that's what will make sure people are doing it.

(Practitioner, P13)

There were several accounts among decision-makers and practitioners regarding the benefit of 'bottom up' and 'top down' approaches to monitoring and implementing evidence-based behaviour change approaches.

…the service providers are full of knowledge cause they're working with the people so they're probably the best people to feedback the academics and the commissioners about what is working and what's not but then equally we need that advice back down to say what have you tried all these different techniques?

(Practitioner, P8)

Several reports acknowledged that the requirement for practitioners to consult NICE guidance on behaviour change is cursory, and rarely translated into practice.

I think the evidence base is mentioned but not necessarily integrated in a way that maybe it could be. I think its bit of a tick box exercise as

opposed to being, you know, used in a way that's useful.

(Practitioner, P14)

3.7. Beliefs about consequences

Some decision-makers believed use of behavioural science evidence has limited impact. This was because of limited perceived relevance to the local profile, and concern about scientific uncertainty and over-simplification of health issues [see (Armstrong et al., 2014; Orton et al., 2011).

I mean you can have some evidence that's a sweep across research that's been done internationally or nationally but in actual fact whether it will work locally to us is really, really important.

(Decision maker, P4)

This sentiment further supports Brownson and colleagues' (Brownson et al., 2009) perspective that the translation of science into practice requires information on the 'realities' of the context (2009:176). Whilst some recognised the contribution academic evidence could make:

I don't think it's used enough to challenge the market 'cause I think it is genuinely important and I think that in any tendering process in the future I would use it in a market engagement.

(Decision-maker, P1; supported in Table 1, step 24)

… there was agreement that such evidence is not valued in the commissioning process:

No. I don't think it [evidence] is [valued] at all. I think it goes more basic than that, I think there's a lack of evidence per se *which is used in the commissioning cycle. I think particularly in the top level- top layer of decision-making it's not evidence based at all.*

(Decision maker, P19)

It became apparent that less value was placed on the use of academic evidence because competing factors are prioritised including political, financial, and resource constraints (see also (Orton et al., 2011; Mitton et al., 2007) and sections below on social influences and environmental context and resources). Furthermore, some felt that behavioural science research application may prove too rigid, overwhelm practitioners and stifle innovation.

…let's face it within the local authority not all commissioning decisions [are] based on evidence and I think sometimes its seen as a challenge or people don't really understand or actually sometimes it stifles innovation, you know, how can we…pilot things, and try new things if you're constantly asking for an evidence base.

(Decision-maker, P2)

3.8. Professional role and identity

Applying the evidence base was deemed more compatible with the roles of decision-makers than practitioners:

I'd say it would be compatible. I think it's probably an essential part of a commissioner's job to use that to help you know it's what the local needs of the population combined with the evidence of what we know works then you have the starting point of what you should commission.

(Decision-maker, P7)

It was suggested if practitioners see the benefits of an approach, they will have greater motivation to deliver it as part of their service.

I think for some practitioners when they understand the benefits of that and they see a behaviour change that is what will motivate them…they often do not see an outcome for it, so hence why they do not see the benefits of using research based evidence, does that make sense?

(Practitioner, P18)

3.9. Beliefs about capabilities

Decision-makers and practitioners expressed a lack of confidence in using evidence around behaviour change to support their decision-making.

Probably not too confident. Only because again I do think that sometimes depending on the way in which papers are written. When you get to a theoretical stuff actually if you haven't been immersed in that yourself… then it can be really difficult to interpret.

(Decision-maker, P12)

One practitioner also felt under-confident in seeking expert advice on the content of their services from academics, preferring health professionals.

maybe not confident to seek advice from academics in case I don't know they might not understand… we used to speak to the dieticians in Warwickshire and get them to look as session plans.

(Practitioner, P8)

3.10. Reinforcement

One decision-maker reported that the commissioning process was challenging, which serves to reinforce reactive rather than systematic, EIDM [see (Nutley et al., 2003).

Things tend to happen that impact on a very non-smooth commissioning process sometimes so you just have to respond or react to that or incorporate it or not as you make the decision to do, so it's not always as straightforward process unfortunately.

(Decision-maker, P9)

There was consensus regarding the focus on measuring outcomes within the commissioning culture instead of how outcomes are achieved.

I suppose the focus does tend to be on outcomes and not necessarily how we get there.

(Decision-maker, P12)

For practitioners therefore, the focus on outcomes alone is reinforced, with little incentive to focus on how those outcomes were achieved.

I think probably focus more on the outcome because that's what we're measured by.

(Practitioner, P15)

3.11. Emotion

Overall, decision-makers felt more positive about using academic evidence to inform decision-making, compared to practitioners.

Positive I think it's really helpful particularly so I'm a commissioner and my background isn't in public health at all and so for me it gives me that reassurance that I find making a decision around something that is actually used.

(Decision-maker, P7)

Probably a bit negative towards it.

(Practitioner, P16)

Similar insights were echoed in a case study of organisational change involving decision-makers emphasising the importance of identifying the range of positive and negative emotional responses to EIDM and organisational change (Peirson et al., 2012).

One practitioner suggested increasing the use of evidence-based

behaviour change approaches in practice, requires emotional buy-in from practitioners.

I know we don't like top-down approach but actually … if we're given information above and it becomes part of their frameworks and their pathways that they use …it will get hearts and minds by giving them a summary that they can understand the bullet points that relate to them and also they would believe it on a face-to-face or somebody delivers it on a face-to-face. I think that will make a massive impact.

(Practitioner, P18)

Some decision-makers also described their tendency to look for evidence to support their gut feeling about use of a particular approach for health improvement:

I think one tends to look for evidence that supports one's gut feeling on what might work rather than looking for something that will, well not support it.

(Decision-maker, P5)

3.12. Social influences

3.12.1. Raising the profile of behaviour change among stakeholders

Decision-makers cited barriers related to elected council members with limited understanding of the value of behavioural science evidence. When councillors were on board this acted as an enabler.

We do briefings for counsellors in the county council so if something that could be presented to them about why we use it and the benefit of using behaviour change. I think would get them on our side a bit more.

(Decision-maker, P1)

Similar findings were reported by Armstrong and colleagues (Armstrong et al., 2014) where survey respondents rated councillors as the greatest influence on decision-making. Decision-makers emphasised the importance of raising the profile of evidence-based behaviour change approaches among other departments within the council and external stakeholders.

I think maybe because we're having to collaborate a lot …that is the way going forward we need to think about how we raise the profile of behaviour change with our internal and external co-commissioners really. I would say that's missing greatly.

(Decision-maker, P4)

3.12.2. The public health culture

Decision-makers' accounts revealed a tendency to commission the same intervention until the next trend is introduced.

After a few years somebody else is introducing another programme that everybody is now using so it's like a cattle effect you know one uses it, they all use it.

(Decision-maker, P5)

One decision-maker reported that the public health culture prioritised tacit knowledge and experience as well as political influences over academic evidence.

It's going to sound REALLY basic, but it's the value of evidence. I think with some of our decision-makers, you know, they think their life experience is enough. And, you know, they will have other political motivations as well.

(Decision-maker, P19)

There were also narratives among both decision-makers and practitioners regarding public health's limited provision of practitioner support.

I think we've got a lot to do to try and really support practitioners.

(Decision-maker, P9)

One practitioner reported the need for a systematic process for managing the communication between public health decision-makers and practitioners.

Bits come through but it's not always co-ordinated so it tends to be you've had a conversation with somebody …you think they might find this information and you get that …and that's really helpful but it's only because you've had that conversation; there's no kind of systematic way of using that down to your providers.

(Practitioner, P14)

According to Peirson and colleagues (Peirson et al., 2012) a supportive culture has been reported as a key 'contextual determinant of change' enabling EIDM in health-related sites (2012: 10). Central features of such cultures comprise: valuing individuals, learning and the uptake of research evidence, fostering innovation and risk-taking; and allowing time for critical reflection (Brownson et al., 2009; Kitson et al., 1998; Riley et al., 2010; Stetler et al., 2009). In contrast to other 'more technical and/or discrete aspects of EIDM capacity building' such as providing tools and training staff, cultural change is lengthier and more challenging (Potter and Brough, 2004). Embedding EIDM firmly in long-term strategy requires ensuring time is allowed for it to become normalised (Peirson et al., 2012).

3.12.3. Public health practitioner culture

One decision-maker felt that the practitioner culture gives precedence to the traditional medical model over behavioural approaches.

I think the barriers known as culturally in service providers that they don't see that there's cause what they're providing in some of our services is a very medical model that kind of prevents them from thinking about the behaviour change stuff.

(Decision-maker, P1)

There was also consensus regarding practitioners' reluctance to change working practices and implement new approaches:

They find it hard to look at other ways of, you know, changing how they deliver based on the evidence that's out there and I think some people really struggle with that.

(Practitioner P18)

According to Brownson and colleagues the 'tendency to continue doing what has been done in the past is a powerful impediment to change' (Brownson et al., 2009: 18). However, one decision-maker felt that practitioners were becoming more aware of the importance of academic evidence and felt they would appreciate support for implementation and evaluation:

The providers that I work with I think have got a greater sense that the evidence is important, I think they appreciate some support with evaluating it and working out how to apply it within the context of the service.

(Decision-maker, P6)

3.13. Environmental context and resources

3.13.1. The format of academic papers

The format of academic papers was cited as hindering evidence use. Some decision-makers disliked the inconclusive nature of papers, limited practicality and jargon (Mitton et al., 2007; Wye et al., 2015).

I think from my point of view a lot of research is very theoretical. And it could be made much more practical.

(Decision-maker, P5)

3.13.2. National behaviour change guidance

Whilst NICE guidelines are seen as a knowledge translation strategy (Orton et al., 2011) their usefulness for public health decision-making was queried. Decision-makers and practitioners reported barriers in relation to their length, clarity and relevance.

Yeah well they weren't necessarily practical to implement, they gave you ideas but it was obviously idealistic some of them.

(Decision-maker, P8)

I mean I know I keep going back to the NICE guidelines but it's so difficult to find the main point within it, it's wordy, it's long and it's not written that well and I find it…I see that there are obviously great points within that that we have to adhere to but it's how you can relate that.

(Practitioner, P17)

Similar findings were reported in a recent study (Atkins et al., 2017) exploring the influences and perceived usefulness of NICE guidance where context was identified as missing from the way the guidance are framed along with limited local level relevance.

3.13.3. Political environment

The political environment was recognised as a key driver in the commissioning process, with priority towards the cost of interventions as opposed to the evidence-base.

We have to get our approval for what we commission and I'm not convinced that politicians have a good enough understanding of things like behaviour change technique so sometimes we have to be very black and white in the evidence we provide because you know what they're looking for is value for money and economical effectiveness.

(Decision-maker, P5)

In this regard, decision-makers use the evidence when it can provide cost-effectiveness data.

It is the pounds and pence that's gonna speak the loudest and if you can prove that actually has been found it's evidenced that gives it some clout doesn't it?

(Decision-maker, P4)

3.13.4. Lack of time and workload pressures

Decision-makers' and practitioners' reported limited access to journals and time to conduct literature searches (Orton et al., 2011; Mitton et al., 2007; Wye et al., 2015). Practitioners also reported limited time for training on delivery of BCTs.

Sometimes when you're really busy you might put it to one side which sounds really bad but it's a reality of the everyday stuff…sometimes… it is time and you think that would be really good and then you look at it and then everything else comes at once…you've got so many other pressures.

(Decision-maker, P15)

3.14. Links between data and the commissioning process

Assignment of data to eleven domains from the TDF has identified that the barriers and facilitators to use of behavioural science evidence in public health sit across person-level domains (e.g. knowledge) and wider environment-based domains (e.g. political environment). Efforts to increase evidence use will need to address barriers at different levels of the system (Glanz and Bishop, 2010). In Table 2 below we set out the key steps identified in the commissioning of a health improvement service (weight management) and having mapped this against the data above to identify the opportunities for embedding application of evidence.

3.15. Limitations

Whilst the findings are likely of relevance to many working in public health, and stakeholders will be able to take account of contextual parallels and disparities to assess the implications for them (Peirson et al., 2012), it may be that the geographically focussed nature of the work means barriers or aspects of good practice in other areas are not represented. In addition, from the experience of applying the TDF in this study, it is noted that application of the framework was useful in defining behavioural influences, but lacks explanatory detail required for a depth of understanding. For example, a barrier defined as 'beliefs

Table 2
Key recommendations for increasing behavioural science research uptake in public health practice.

Aimed at researchers:
1. To address finding in Section 3.13.1 above - Align with public health decision-makers' requirements for research including: providing a summary of main findings and effectiveness in publications; align evidence to current and future policy environments; provide relevant indicators for health targets; provide suggestions for implementation; ensure research can be easily incorporated into common sense knowledge required at a local level (Orton et al., 2011).
2. To address wider findings in Section 3.13 above - Gain understanding of the environmental challenges in which decision-makers operate and determine how to deliver information relevant to the real world context (Michie et al., 2014).
3. To address multiple barriers including Section 3.9 above - Get involved with local and/or national public health departments and providers; engage them as members of PPI groups and stakeholders in research.

Aimed at policy makers:
1. To address finding in Section 3.13.1 and to support researchers to implement recommendations for them above – Further reform the REF system in universities (researcher incentive system) which currently incentivises publishing in peer-reviewed journals and acquiring grants over applied translational research aligned to end users' needs (Michie et al., 2014).
2. To address Sections 3.5 and 3.6 from findings above - Form new policy making it compulsory to have an evidence base (if available) unpinning service specification.
3. To address Sections 3.6 and 3.7 from findings above - Form new policy requiring public health practitioners to deliver evidence based services and monitor these throughout the programme rather than just reporting on outcomes.

Aimed at public health decision-makers:
1. To address Sections 3.3, 3.4, 3.5, 3.8 and 3.9 from findings above - Train decision-makers to support them in explicating what they want in relation to behavioural science evidence in service providers' offers.
2. To address Sections 3.3, 3.4, 3.5, 3.8 and 3.9 from findings above - Support decision-makers to embed behaviour change evidence into the commissioning cycle (e.g. via an online programme planning tool that is integrated with commissioning cycle).

Aimed at public health practitioners:
1. To address Sections 3.3, 3.4, 3.5, 3.8 and 3.9 from findings above - Train practitioners in understanding how what they currently deliver may align with the evidence base and how they may adapt what they already do in practice by further applying evidence thus strengthening interventions and services further.
2. To address Sections 3.3, 3.4, 3.5, 3.8 and 3.9 from findings above - Develop 'Communities of Practice' (COP) where public health practitioners meet regularly, share their experiences and discuss practice and research evidence (Meagher-Stewart et al., 2012).

Public health environment
1. To address Sections 3.12.1 and 3.13.3 from findings above - Persuade elected council members of the value of behaviour change evidence and strategies to underpin interventions (e.g. via workshops and seminars)
2. To address findings in Section 3.13.4 and issues to do with knowledge (Section 3.3), skills (Section 3.4) and beliefs about capabilities (Section 3.9) - Provide access to university departments who can support evidence review and synthesis and intervention development if resources are not available for this in-house.
3. To address findings in Section 3.13.4 and issues to do with knowledge (Section 3.3), skills (Section 3.4) and beliefs about capabilities (Section 3.9) - Develop and provide a central knowledge management system to access research evidence. This should include work conducted by other Local Authorities to 'reduce duplication and increase transparency and consistency' (Peirson et al., 2012: 10).
4. Embed a change management framework to address emotional responses to EIDM and organisational change (Peirson et al., 2012).
5. To address Section 3.7 from findings above - Enable cultural change so that research evidence is valued (in terms of structure, rewards and training) (Orton et al., 2011).
6. To address findings in Section 3.13.4 and issues to do with knowledge (Section 3.3), skills (Section 3.4) and beliefs about capabilities (Section 3.9) - Ensure research is widely available through email bulletins (Orton et al., 2011).
7. To address a range of barriers including those in Section 3.9 - Improve communication and mutual trust between researchers, decision-makers, practitioners and end users (e.g. via workshops).

about consequences' may help to determine appropriate strategies useful for changing such beliefs, but the detail about what is actually believed is still needed to devise effective messages to do this. For some domains we have defined such detail using sub-themes.

3.16. Significance of the research

In contrast to previous research, this study is the first to consider the perspective of front-line practitioners and their interactions with decision-makers in the application of behaviour-specific evidence to public health. Furthermore, to date, published work in this area has not specifically considered the use of behavioural science evidence or been guided by the TDF. Framing the data in terms of the TDF means we can link findings to other intervention development tools (Michie et al., 2014) in the iterative process of devising interventions and strategies to bring about change.

3.17. Implications of the findings for practice, policy formulation and future research

Research evidence and practice 'are part of a continuum for understanding the determinants of behaviours, testing strategies for change, and disseminating effective interventions' (Glanz and Bishop, 2010: 412). Having reflected on the findings and the extant literature, we offer initial recommendations of methods to increase behavioural science research uptake in Table 2. Given that the data clearly demonstrate barriers at individual and contextual levels we have identified these for relevant individuals and the public health environment and have identified specifically which barriers each recommendation might address.

4. Conclusions

The findings indicate that improving uptake of behavioural science evidence requires a multi-level approach. Our recommendations regarding methods to do this could be applied in diverse public health settings in the UK and internationally. Focusing on improving the public health environment with regards encouraging cultural and attitudinal change and providing relevant training and tools to support decision-makers and practitioners throughout the commissioning process will need to be part of co-ordinated efforts. The next phase of the research involves developing and testing some of the recommendations within the next commissioning cycle for weight management services.

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Conflict of interest

The authors receive money for contract research from various local authority and public health departments including some of those included as participants within the research.

Declarations

Ethics approval and consent to participate

Ethical approval for interviews was obtained (reference number: P41280) from the Coventry University Research Ethics Sub-Committee in advance of the research being undertaken.

Consent for publication

Not applicable

Availability of data and material

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

Competing interests

The authors have received funding for contract research from a range of local authorities in the UK including those in which recruitment for the current study was conducted.

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Authors' contributions

KC conducted the research and analysis and drafted the paper. KB contributed to conceiving the research, supervised the design of the study and analysis of the interviews, contributed to data analysis and commented on drafts of the paper. KB amended the paper after initial review. EF contributed to conceiving the research and commented on drafts of the paper. All authors read and approved the final manuscript prior to submission.

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