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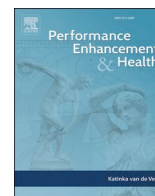
Turnock, LA and Hearne, E (2024) Novel wellbeing and repair peptide use in the UK: Netnographic findings. Performance Enhancement & Health, 13 (1). ISSN 2211-2669

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Research Paper

Novel wellbeing and repair peptide use in the UK: Netnographic findings

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ARTICLE INFO

Keywords:

Peptide
IPED
Wellbeing
Anti-ageing
Netnography
Harm reduction

ABSTRACT

Recently, there has been an explosion of interest in synthetic peptides hormones promoted for wellbeing enhancement purposes, including BPC-157, TB-500 and CJC-1295. With these drugs increasingly accessible through online platforms such as e-commerce sites, this research seeks to understand user experiences of taking these drugs, and the ways in which digital forum spaces facilitate the development of a shared folk pharmacology and further indigenous harm reduction.

Data is drawn from a netnography of peptide-related forum posts, encompassing 493 unique threads totalling almost 15,000 posts. Thematic analysis was used to analyse the data.

Findings are split into two major sections, encompassing motivations for peptide use, and online folk pharmacology. In the first of these sections, findings explored include: Peptide use for the purposes of injury rehabilitation, including post-surgery recovery; Everyday wellbeing use of peptides, including for anti-ageing, with a particular focus on older men wishing to return to gym training for aesthetic and general health purposes; And the relationship between seeking black market peptides following negative experiences with healthcare providers for wellbeing-related issues.

In the second section, key themes relate to: Community knowledge exchange regarding use, including community distribution of harm reduction information; Community understandings of the limits to utility of peptides, and experiences of product not working as anticipated; And information sharing regarding product quality, and potential harms relating to 'scam' sellers and substituted or poor-quality product.

Conclusions show that an emergent folk pharmacology relating to peptides has developed in forum spaces, which informs and encourages use. Many older men appear to be taking peptides for everyday wellbeing purposes, suggesting a need for specific focus on this population in public health work. Issues with healthcare providers appeared to lead users to accessing black market peptides, suggesting specific education for healthcare practitioners around peptides may be important to pursue.

1. Background

In recent years, there has been growing interest in image and performance enhancing drugs (IPEDs), as use appears to be increasing outside the traditional confines of competitive sports and bodybuilding subculture (McVeigh *et al.*, 2021; Sagoe *et al.*, 2014). Recent scholarship has suggested IPED use poses a public health risk (McVeigh *et al.*, 2022), as increasing numbers of recreational gym users appear to be employing these drugs for aesthetic and lifestyle purposes (Hall, 2019; Kotzé & Antonopoulos, 2021; Piatkowski *et al.*, 2020; Turnock & Gibbs, 2023a;

Van Hout & Hearne, 2016), as IPEDs become increasingly accessible through mainstream digital platforms (Antonopoulos & Hall, 2016; Cox *et al.*, 2023; Turnock & Gibbs, 2023b). Along with anabolic androgenic steroids (hereafter 'steroids'), there are a range of other enhancement drugs which similarly appear to be on the rise. These include weight loss drugs (McVeigh *et al.*, 2017), tanning drugs (Van Hout, 2014), sexual enhancers (Koenraadt & van de Ven, 2018), and cognitive enhancers (Mazanov *et al.*, 2013), all of which fall within the broad category of 'lifestyle medicines' (Hall & Antonopoulos, 2016; van de Ven *et al.*, 2019). Despite the recent focus on these drugs, however, a subset that

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remain comparatively under-explored are novel^c synthetic peptide hormones promoted for therapeutic and wellbeing purposes.

This category contains a range of substances that can build muscle, reduce fat, and enhance subjective feelings of wellbeing, though primarily consists of a range of growth hormone releasers and secretagogues, including BPC-157, TB-500, CJC-1295 and GHRP-6, and lipolytics such as Adipotide and Semaglutide (Stensballe *et al.*, 2015; Turnock & Gibbs, 2023b). While peptides like human growth hormone (HGH) have long been used within bodybuilding subculture for muscle and strength gain Monaghan (2002), these novel peptides are promoted more for wellbeing purposes such as relieving chronic pain, facilitating injury rehabilitation, lipolysis and anti-ageing than strictly building muscle (Turnock & Gibbs, 2023b). Notably, these drugs are not subject to the Misuse of Drugs Act (1971) in the UK, and are often sold as 'research chemicals' online (*vide supra*). While organisations like the MHRA may intervene in cases of peptides being sold or advertised unlawfully (MHRA, 2023), paralleling regulation in other countries such as Australia and the US where many peptides similarly are not scheduled drugs, but are still subject to TGA or FDA regulation (Muller, 2023; TGA, 2019), these regulations are often evaded by sellers in digital market spaces.

While some novel peptides have previously been documented in the repertoires of hardcore bodybuilders (Kimergård *et al.*, 2014), they were until relatively recently considered somewhat 'niche' compounds (McVeigh *et al.*, 2021), outside of the 'tanning drug' Melanotan II (Brennan *et al.*, 2014; Evans-Brown *et al.*, 2009a). Recently, however, broader cultural interest in wellbeing peptides has increased significantly. One example is the explosion of interest in semaglutide (Ozempic/Wegovy), a glucagon-like peptide-1 (GLP-1) receptor agonist peptide (Mahapatra *et al.*, 2022) increasingly being promoted as a 'miracle' wellbeing drug, and championed by celebrities like Elon Musk (Medaris & Landsverk, 2023). Promotion of the drug by influencers on TikTok has led to concerns of an explosion in off-label use (Kolovos, 2022), and while semaglutide was recently approved for use in the UK's National Health Service (NHS) for the treatment of obesity (Rackham, 2023), there is the potential for harm with product sourced through the black market (Reuters, 2023). With other lipolytic peptides (e.g. Adipotide) being sold on mainstream e-commerce platforms (Turnock & Gibbs, 2023b), the rising interest in semaglutide may further carry over to these unapproved and unregulated peptides.

Another realm where novel peptides have received increasing mainstream attention is in relation to sporting injuries and accelerating rehabilitation. Sportspeople have been caught using peptides such as Thymosin beta-4 since the 2010s (e.g. *The Guardian*, 2016), with reporting showing a rise in interest and Google searches for peptides following athletes' use being revealed (Dow, 2014). WADA has updated its banned list to explicitly include emerging peptides like BPC-157 (UKAD, 2022) which fall under section S2 (WADA, 2024a), while others, such as semaglutide, are on the monitoring list for 2024 and likely to be prohibited in the near future (WADA, 2024b).

In a recent high-profile example, the UFC's strained relationship with USADA was the focus of reporting owing to superstar Conor McGregor's alleged use of 'experimental peptides' to rehabilitate a leg injury (Martin, 2023). In contrast to other treatments touted as 'miracle cures' in the sporting realm such as stem cells, the immediate accessibility of peptides to non-athletes through digital marketplaces may lead to their normalisation, as awareness of their therapeutic applications in the sporting realm spreads to recreational trainers (Piatkowski *et al.*, forthcoming). With *Men's Health* running an article discussing repair peptides in 2022 (Schuler, 2022), there is clearly growing awareness of novel peptides within the broader fitness community. Reflecting this,

^c The term 'novel' here is used in the same manner as for novel psychoactive substances, denoting their emerging market status, despite some compounds potentially having existed for some decades.

peptides are increasingly discussed by social media influencers for their potential therapeutic applications (e.g. *More Plates More Dates*, 2021). This includes figures like Joe Rogan (18 million followers on Instagram), who has publicly discussed using the peptide BPC-157 alongside medically prescribed testosterone replacement therapy (TRT) on popular podcasts (Flagrant, 2022).

These developments align with recent research documenting the use of IPEDs for therapeutic and wellbeing purposes. While there is often overlap between this and performance or image enhancement (Gibbs, 2023a; Underwood *et al.*, 2021), much wellbeing-oriented use is not specifically linked to sporting or subcultural motivations, as seen in the rise in TRT for anti-ageing among older men (Dunn *et al.*, 2021; Hearne *et al.*, 2022). Turnock (2022) examined therapeutic motivations for using a range of enhancement drugs, including novel peptides, testosterone and HGH. This research highlighted how motivations such as injury rehabilitation, anti-ageing, feelings of subjective wellbeing and the self-medicated management of chronic health conditions are likely to underpin rising interest in novel wellbeing drugs. These works can all be situated within an understanding of the increasing pharmaceuticalisation of 'wellness' and pressures to conform with expectations of 'optimal' wellbeing in the workplace and society (Cederström & Spicer, 2015; Hall, 2019; Hoberman, 2005). As mainstream culture increasingly pushes narratives of 'optimal' wellbeing in later life, the trend for individuals to seek enhancement in order to align their body and subjective experience of the self with prevailing cultural expectations is apparent (Conrad & Potter, 2004; Dunn *et al.*, 2021; Gibbs, 2023a).

Against this backdrop, there has been a notable rise in peptides' accessibility through online marketplaces. McVeigh *et al.* (2021), in mapping evidence of IPED use in the UK, note that the use of these drugs is growing, as increased distribution via the internet from low-cost producer nations has moved them from being prohibitively expensive to commonplace. Turnock and Gibbs (2023b) highlight just how widespread, cheap and accessible some of these compounds are, with oral, nasal and injectable-form peptides available for purchase through popular e-commerce sites for as little as £20 a vial (~\$26 USD). Yet despite prior publications noting the presence of these drugs in digital market spaces (Evans-Brown *et al.*, 2012; Kimergård *et al.*, 2014; Turnock, 2018), specific research into user experiences of them has been comparatively limited, outside of Melanotan II – a drug more associated with image enhancement (Gilhooley *et al.*, 2021; Van Hout, 2014).

One of the only publications to offer an in-depth exploration into user experiences of novel wellbeing peptides specifically is Van Hout and Hearne's (2016) netnography of women who used CJC-1295. This research explored the motivations and experiences of women who had used this peptide for a multitude of reasons, including injury repair and rehabilitation, lipolysis, mood elevation, and anti-ageing. Van Hout and Hearne (2016) situate these experiences within the context of the rising popularity of anti-ageing treatments in media, and the increasingly accessible online retail of enhancement drugs, along with gendered expectations regarding 'sporting bodies'. Notably, they document the development of an online 'folk pharmacology' (see Southgate & Hopwood, 2001) which encouraged peptide consumption through sharing approaches and recommendations for use. Such in-depth research into novel and emerging forms of drug use is significant to understanding trends in access, supply and harm (Chatwin *et al.*, 2017). Consequently, this article seeks to build on Van Hout and Hearne's (2016) explorations by examining user perspectives of wellbeing peptide use beyond CJC 1295, to encompass a range of emergent compounds, adopting a similar netnographic approach.

This article looks at forum posters' perspectives on a range of peptides and experiences using them, looking first at motivations for peptide use, including: injury rehabilitation, everyday well-being and anti-ageing, and motivations relating to issues with healthcare providers. It then turns to an analysis of the communal folk pharmacology (Southgate & Hopwood, 2001; Van Hout & Hearne, 2016) of use operating in forum space, including: community-embedded knowledge exchange and

indigenous harm reduction, perspectives on the limits to utility of peptide use and community rebuttal of notions they are 'miracle cures' from established forum members, as well as harm reduction relating to peptide access and concerns regarding product legitimacy. This is followed by a discussion of issues, and implications for policy and future research.

2. Methods

Our research sought to explore forum posts to understand the use of wellbeing peptides per users' subjective interpretations of their experiences and lived realities (Patton, 2002; Van Hout & Hearne, 2016). To achieve this, the research focussed on an in-depth exploration of one of the top UK fitness forums where peptides are discussed, using a passive netnographic approach (Brennan *et al.*, 2018a; Kozinets, 2010) to the analysis of 493 relevant threads, containing almost fifteen thousand total unique posts. In-depth exploration of a specific website or social networking site has previously been employed in enhancement drug research as a means of offering rich detail regarding user practices and experiences (Henning & Andreasson, 2021; Sverkersson *et al.*, 2020, 2023; Turnock, 2021a), drawing on the case study methodologies often employed in 'offline' IPED research (Kotzé *et al.*, 2020; Turnock, 2020). Forums are important cultural spaces where discussion of drug experiences and harm reduction advice is sought and shared between peers (Hearne & Van Hout, 2016; Tighe *et al.*, 2017), making them valuable sites for engaging with community understandings of novel drug use and evolving practices (Andreasson & Henning, 2023; Brennan *et al.*, 2018a, 2018b; Van Hout & Hearne, 2016).

The forum explored was selected based on several criteria. First, given this research was an extension of a prior UK-based connective ethnography (see Turnock, 2022; Turnock & Gibbs, 2023b), the research chose to focus on a UK-based forum. This was important to our selection owing to the differences in legality and accessibility of these products across different jurisdictions. With novel peptides legal to possess, but not approved for sale as medicines or supplements in the UK (Turnock & Gibbs, 2023b), selecting a UK-specific forum helped avoid any ambiguities around legal status which may have impacted discussions or experiences of forum users. Second, among UK-based websites, the selected forum appeared to be the largest general fitness forum that was not specifically dedicated to IPEDs, but that also did not ban explicit discussion of them. This ensured the data would meet Kozinets' (2010) criteria regarding scale, interactivity, and heterogeneity in netnographic research. Finally, as a publicly accessible forum without a requirement to register to view threads, the data could be said to be occurring in 'public space' and sampled without ethical issues relating to reasonable expectations of privacy (Enghoff & Aldridge 2019). Additionally, the 'open' nature of the forum likely fed into the popularity noted as the second selection criteria, meaning a greater likelihood of individuals from outside of hardcore bodybuilding subculture interacting in forum space than would occur on a 'closed' IPED forum. This ease of access for 'casuals' was something felt to be important to capture when investigating these drugs, given their increasing availability through mainstream websites.

Data collection consisted initially of using the forum search function to identify any threads mentioning the terms 'peptide'/'peptides'. This initial bulk search was then enhanced through subsequent searching of the specific novel peptides most commonly identified among users ('BPC-157',^d 'TB-500', 'CJC-1295', 'GHRP', 'Sermorelin', 'Semaglutide'/'Ozempic' and 'Melanotan') along with 'MK677'/'Ibutamoren',^e to capture any threads discussing these which did not include the word 'peptide' itself. In total, 493 threads were captured. Threads with zero

^d Note: Various permutations for each were checked, e.g. 'BPC-157', 'BPC157' and 'BPC 157'.

^e MK677 / Ibutamoren is not a peptide, but falls within the category of novel repair and wellbeing drugs this research sought to explore.

replies (i.e. featuring only the original post) were excluded from analysis, as these were not felt to be reflective of community perspectives on use, given they may be posted by unverified accounts, ignore community rules or norms of posting, or potentially even come from peptide sellers trying to promote products (see Gibbs, 2023b) if there was no broader community interaction or response present. Analysed threads ranged in size from a single reply to 10,621 replies, however the latter was an extreme outlier, as it was a recurring 'ask me anything' thread with a qualified medical professional, with the second largest thread having just 1251 replies. The median number of replies was nine (mean = 30), reflecting the fact that most threads asking specific questions were answered within the first few replies.

The researchers read through the captured threads, extracting data relating to wellbeing peptides (using Excel), and excluding posts which did not discuss either novel peptides or wellbeing-oriented use. In practice, this meant excluding some threads that were predominantly focussed on HGH/insulin and their application for bodybuilding purposes. However, threads focussed on HGH which also featured discussion of peptides like TB-500 and BPC-157 for wellbeing purposes were still included in the analysis. Discussions of the closely-related drug MK677 (Ibutamoren) were also included, given it is utilised for similar reasons to peptides, and even listed as a peptide in popular fitness articles like Schuler (2022).

Coding and analysis followed the protocols for thematic analysis (Braun & Clarke, 2006). This approach was chosen owing to its flexibility and ability to offer a rich and detailed account of the dataset (Braun & Clarke, 2006; Campbell *et al.*, 2021). The first author developed themes inductively when reading threads, using my understanding of the literature and prior familiarity with these substances to determine the importance of identified themes. This reflects thematic analysis' acknowledgement of the value of researcher subjectivity (Campbell *et al.*, 2021). Themes were then refined, and the dataset reanalysed following the method outlined by Braun and Clarke (2006). The first author's positionality as a former powerlifter who has spent many years training and engaging with a variety of forums informed cultural understandings of the data, which facilitated my interpretation of aspects that may have been obscure to a cultural outsider (Piatkowski *et al.*, 2020).

All names and identifying characteristics (e.g. specific locations) have been anonymised, following standard ethical practice (Enghoff & Aldridge, 2019). No deception was employed, and all data was sampled from 'public' forum spaces, meaning posters would not have a reasonable expectation of privacy (Enghoff & Aldridge, 2019; Grodzinsky & Tavani, 2010). However, some specific sensitive data has been excluded, following understanding of researcher responsibilities in reporting, and established best practice for this type of research (Henning & Andreasson, 2021).

3. Findings

Findings are grouped into two main categories, reflecting the core themes we uncovered in our netnographic research and thematic analysis. The first section broadly explores motivations for peptide use and discussions relating to intentions in using and experiences or concerns relevant to this. The subsequent section then groups findings relating to the communal folk pharmacology of the forum, and explores how this informed knowledge exchange practices and harm reduction norms in this digital space.

4. Motivations for peptide use

4.1. Injury rehabilitation

A common motivation for peptide use was accelerating injury repair, including post-surgery recovery. Several threads opened with posts describing an injury and asking for advice from those who had used

peptides to recover from something similar. For example, one former bodybuilder who was returning to training in his 40s and tore his pectoral muscle asked about experiences using peptides to recover from such injuries. This was met with several replies documenting positive experiences using peptides for healing tears, with one poster describing what he used for a similar tear, and his experiences with the recovery process:

'I used BPC and TB after [pectoral reattachment] surgery. The physio was amazed how quick I was recovering.'

These replies led the original poster to comment that he "*will give the peptides a go definitely*", illustrating how the sharing of positive experiences often encouraged those seeking advice to state they would use peptides themselves. Numerous threads followed this structure of advice-seeking followed by replies offering personal experiences of use:

'I ran an aggressive recovery protocol of various peptides and supplements, made very quick progress to the point of leaving my physio baffled and unable to advise me on any routine to follow as it would be a regression in what I was already doing.'

For injury rehabilitation, the use of BPC-157 and TB-500 in conjunction appeared to be the emergent community recommendation. This reflected the development of an 'ethnopharmacological taxonomy' of compounds (Monaghan, 2002; Sverkesson, 2020) on the forum, or what Van Hout and Hearne (2016) term a 'folk pharmacology' of use, where these two peptides came to be promoted as the 'optimal' drugs for repair purposes:

'I've found [BPC-157] to be awesome alongside TB-500.'

'I used both [peptides] for a tendon tear. A year later the tear was gone. It would be a very bold statement to say the peps healed me but I'd say they definitely helped.'

Overall, a substantial share of threads across the various forum sections featured recommendations for these two peptides whenever injury rehabilitation was discussed. Notably, even in the 'bodybuilding' section where greater familiarity with IPED use could be expected, when threads raised the use of HGH for repair following traditional sporting and subcultural understandings of protocols for injury recovery (Erotokritou-Mulligan *et al.*, 2011; Turnock, 2018), these often attracted replies which rejected this, and instead embraced the emergent folk pharmacology of TB-500 and BPC-157 as the best 'stack' for repair:

'GH for repair of acute trauma is minimally effective. BPC & TB are far more effective assuming other factors key to recovery are already in place.'

This is significant as it points to novel peptides not simply being seen as an accessible alternative to HGH for those unable to obtain this drug, but were increasingly seen as superior compounds for repair purposes, even among hardcore subcultural trainers. While HGH was still taken by many bodybuilders for its perceived benefits to size when used alongside steroids, there appeared to be rising scepticism of its utility strictly for repair purposes now that novel peptides were so readily available. With the forum being a shared space between bodybuilders and those from outside this subculture who had less familiarity with 'traditional' norms of IPED use, the emergence of this recommended 'stack' across different forum sections – including among runners, cyclists, BJJ fighters and tennis players alongside bodybuilders – highlights how information sharing norms in digital spaces led to the development of a broader folk pharmacology of compounds for injury rehabilitation.

4.2. Everyday wellbeing and anti-ageing

While recovery from surgery and acute injuries sustained during exercise were recurring themes, many posts focussed on dealing with 'everyday' aches and pains, and general subjective wellbeing. One

thread asking for experiences using BPC-157 received numerous replies documenting positive experiences using the drug to deal with conditions like tendonitis and sciatica, rather than tears or acute injuries:

'Definitely helped, got rid of nagging tendonitis in left elbow which I've had for years.'

'Worked really well for a nerve pain issue.'

This notion of peptides being treatments for everyday aches and pains rather than specific to sports injuries illustrates the broad interest in these emergent drugs, and individuals from a variety of different exercise levels, ages and backgrounds (from novice lifters, recreational runners and casual sport enthusiasts to hardcore bodybuilders and sport competitors; from early-20s to early-60s; male and female from diverse regional geographies) appeared to be using them, and posting their experiences.

Despite many positive posts, the use of novel peptides for general aches and strains was not universally endorsed, and some posters cautioned that potential harms would likely outweigh the benefits in such instances, reflecting the cost/benefit calculation that underpins experimental drug use:

'These peptides aren't without risk and I wouldn't be taking them for everyday joint aches. Instead find what's causing the problem and fix it.'

With the risks of these drugs not fully understood, those from more 'expert'-type backgrounds (Christiansen *et al.*, 2017) would advise against longer-term use without specific reason, even while acknowledging the drugs' potential value for treating acute injuries. Instead, multiple posters in the above thread recommended the use of 'collagen peptides' for everyday joint health and wellbeing, out of acknowledgement that the risks of longer-term BPC/TB use were still unclear.

Linked to concerns regarding everyday aches and pains, a key theme related peptides' utility for anti-ageing, particularly for those who wanted to undertake gym training or participate in sports, but were aware that their recovery was slowing with age:

'I'm 39 and used to lift heavy weights but was injured and took a long time off. Been training on and off but my recovery isn't what it was. I'm thinking of getting on TRT for it but I've got two herniated discs so thinking of doing a peptide / TRT cycle [for energy and sciatica].'

While such threads generally featured advice on structuring training around longer recovery windows and not pushing oneself too hard when older, they also discussed the potential benefits peptides could have for anti-ageing, with the above poster stating he would "definitely" use peptides after being reassured they could help with his stated goals.

Along with interest in peptides to offset greater recovery needs and likelihood of injury when training as an older man, there were also discussions of the broader benefits they could provide for anti-ageing:

'I use [CJC-1295] for cosmetic reasons. Keeps the skin looking healthy and less wrinkles.'

While less prevalent than discussions regarding peptides' restorative properties (linked to the particular forum space researched, which was more gym and sport oriented, and seemingly male dominated), cosmetic anti-ageing was clearly a factor underpinning much use, and among many older men who were looking to return to gym training these often overlapped. Notably, several users enquiring about anti-ageing peptides appeared to have already used Melanotan II, suggesting some degree of progression from one 'culturally acceptable' form of enhancement to others.

Interestingly, the role of age came through in another way, as seen in a thread where a former bodybuilder discussed the use of Sermorelin for general fitness and wellbeing now he was an older man:

'I've always been wary of GH related peptides and secretagogues but the older I am getting the less I care. Probably less harmful than some

of the other stuff I've done with my body over the years being honest!'

With general wear and tear pains more of an issue for weight trainers post-40, the appeal of peptides had actually increased for this poster, despite the fact that he had considered them to be too risky as a bodybuilder when younger. This may point to the increasing normalisation of peptides as awareness of them spreads, with attitudes shifting as the drugs become more accessible and culturally accepted (Turnock & Gibbs, 2023b). However, it also demonstrates why it is important to analyse IPED use beyond the contexts of aesthetically-oriented young men, reflecting that older individuals have particular motivations and understandings underpinning their use, which can inform their approach to risks and harm (Hearne *et al.*, 2022). As priorities for this individual shifted, peptides came to be seen as a preferable option for his training needs.

4.3. Issues with healthcare providers

Several posts featured users discussing their negative experiences with the NHS / Healthcare providers (HCP), and the role this played in their turning to unregulated peptides. One user who had been taking a BPC-157/TB-500 stack noted he had previously tried seeing his GP and a range of physiotherapists, but felt they had no interest in helping him:

'I've been dealing with my shoulder problem for a couple of years now – tried different physios, all kinds of recovery exercises... I have only bad experience with the NHS. Had some back issues years ago with no help at all from NHS.'

This was a common sentiment among those who mentioned accessing HCPs prior to exploring peptides, and in another thread a runner who had been suffering with groin pain for some months and had no success with his NHS physio asked:

'Do I go back to my GP and ask for another physio? Should I try something like BPC-157? ... Had similar issues in the past, found NHS physios are pretty useless and don't do much more than give you exercises you can easily find online.'

This parallels findings in prior research into IPED use, where frustrating with HCP led to users seeking out black market sources for steroids or peptides. In Turnock (2022), it was noted that some wellbeing-oriented IPED use arose in response to user perceptions that HCP did not take concerns regarding injury, chronic health conditions, or low wellbeing seriously, and were perceived as 'barriers to good health'. Similar perceptions have been observed in research into black market TRT (Gibbs, 2023a; Underwood *et al.*, 2021), and IPED user interactions with HCP more broadly, where lack of specific knowledge among providers and perceptions of stigma have been noted as barriers to treatment (Dunn *et al.*, 2016; Harvey *et al.*, 2022; Turnock & Mulrooney, 2023). In the contexts of a culture where health is increasingly viewed as a consumer choice, and self-medication for lifestyle desires normalised (Dunn *et al.*, 2021; Hall, 2019; Harvey, 2013; Gibbs, 2023a), perceived barriers to accessing this through legitimate means motivates black market drug access.

Further reflecting this, among those forum posters motivated by anti-ageing rather than injury repair, complaints regarding HCPs not being responsive to wellbeing needs similarly appeared to underpin use. A clear example was an older male who was prescribed a low dose of testosterone for TRT, yet still had low energy, whose doctors refused to increase his dose:

'I'm on TRT through NHS and their protocol is 250 mg once every 4 weeks. I have no energy whatsoever but they can't give more. Looking for alternatives to try and get a normal life. I was looking into peptides such as MOTs-C or BPC 157... Just want to have more energy ... 56 years old, 200lbs. Any ideas appreciated.'

As other posters noted, the NHS TRT protocol described was below the levels prescribed elsewhere, and was the reason for his low energy. Replies were consequently a mix of recommending peptides for energy and everyday wellbeing, along with suggestions he should visit a private clinic where 'standard across the board TRT protocol' would be 125 mg/week (i.e. double the amount currently prescribed). This thread mirrored findings regarding frustrations with HCP in relation to prescription TRT in other research, where users felt they were pushed onto black market testosterone because doctors disregarded their complaints of low wellbeing (Turnock, 2022; Underwood *et al.*, 2021). While the above individual noted he would try a private clinic to see if he could get a higher TRT dose, it is clear his queries regarding peptides were underpinned by a perception that his HCP was acting as a barrier to wellbeing.

In other threads on rejuvenation, TRT, and the use of peptides, there was discussion of alternative treatments and their potential anti-ageing benefits. In one thread regarding GHRP-2 for anti-ageing, posters discussed a private anti-ageing clinic in Panama, and how their work compared to NHS protocols:

'Benefits of GHRP-2 are immense, and it has enormous applications in the field of age management as practiced by centres like the Age Management Panama clinic'

'Yeah, there is scope outside just what the NHS recommends.'

Both anti-ageing users and those looking for injury rehabilitation therefore often stated they came to unregulated peptides only after feeling that HCP did not sufficiently address their wellbeing needs, indicating a potential point where educating healthcare practitioners around these drugs and the relationship between use and negative experiences with wellbeing care may be beneficial (Atkinson *et al.*, 2021; Dunn *et al.*, 2016; Dunn *et al.*, 2023; Hearne *et al.*, 2022).

5. Online folk pharmacology

Building on Van Hout and Hearne (2016), the second core theme identified in our analyses related to the operation of a communal 'folk pharmacology' (see also Southgate & Hopwood, 2001) in forum space, where embedded knowledge of peptide effects, risks and relevant harm reduction strategies and advice were shared among community members.

5.1. Community knowledge exchange and indigenous harm reduction

Community knowledge exchange and indigenous harm reduction norms are key aspects to drug-related forums, where understandings of best practice can be shared by more experienced forum members with those requiring such information (Chiausuzzi *et al.*, 2013; Hearne & Van Hout, 2016; Tighe *et al.*, 2017; Turnock & Townshend, 2022). Consequently, many posters in the present research specifically engaged with the forum to either ask for or receive advice regarding the use of peptides.

One of the most common thread types were those started by a poster wishing to get input from individuals who had actually used and experienced a compound they were considering taking:

'I'm looking Into CJC195-DAC. I've seen reviews, blah... I'd rather hear it from someone who's actually used it and experienced it.'

This preference for hearing the lived experiences of other users may be reflective of the distrust many IPED users have for 'official' sources of knowledge (Dunn *et al.*, 2016), which fuelled the emergence of 'bro science' – folk pharmacology – in subcultures like bodybuilders as a means of understanding compounds (Underwood, 2017). It also parallels community norms of information sharing regarding drug experiences seen on sites such as Erowid, where experience-sharing, recommended approaches and harm reduction are explicitly embedded,

and safety information sought by forum users (Boyer *et al.*, 2005; Wightman *et al.*, 2017).

Advice threads could relate to all manner of queries. Frequently, the ‘research peptides’ section of the forum would attract posters who, unlike those in the ‘bodybuilding’ sections, did not have experience using other drugs. Consequently, basic questions regarding how to inject and how often, as well as best practices for injecting, were common:

‘I have been reading about BPC-157 injections... Do I inject those specific areas to help the injuries? ... I am a complete newbie and am just looking for peptides to help with injury so don’t know much at all.’

Consequently, the forum hosted a lot of information relating to community understandings of ‘best practice’ approaches to use. This included both protocols regarding dosages and injection frequency, as documented by Van Hout and Hearne (2016) for CJC-1295, along with more specifically harm reduction focussed advice regarding safe injecting practice. As a clear example of this, with some peptides requiring multiple injections per day, one poster asked about the possibility of drawing up multiple syringes in advance, but was cautioned against this:

‘Do it fresh, and limit best as possible any kind of bacteria forming.’

‘I wouldn’t [advise it] only because I’d be worried about bacteria formation.’

This was a benefit to the forum’s shared space, where individuals from outside of ‘hardcore’ gym cultures could seek advice from those who had been injecting drug users for some years, and were able to advise on safer practices. The folk pharmacology noted previously thus existed alongside community norms of harm reduction advice sharing, which was reinforced through the same mechanisms of experienced users sharing information and their lived experiences with others.

One of the more significant findings regarding community harm reduction was an ongoing ‘ask me anything’ (AMA) thread with a qualified medical professional, who offered advice on all things enhancement drugs (steroids, peptides, SARMs, blood tests, etc.). This thread was constantly being bumped to the forum’s main page whenever this professional came online to answer questions, and was particularly notable since the quality of information went beyond standard community harm reduction discussions, to encompass more technical knowledge regarding the mechanisms of action of particular drugs:

Q: ‘Does BPC-157 increase RBC/hematocrit like TB-500 does?’

A: ‘I don’t think so. TB-500 is basically a thymus gland hormone, and thymus may produce or be involved in haematopoiesis (RBC production) ... BPC-157 is a gastric peptide, so I don’t see why it would increase RBC.’

With increased haematocrit levels associated with harms when using certain IPEDs (Brennan *et al.*, 2018b), information sharing regarding which drugs posed a risk in this area was an important form of ‘expert’ harm reduction. While forum regulars had tried to establish this through reading and posting links to what scientific studies they could find, this AMA thread offered the opportunity for queries arising from such independent research to be run past a medical professional. This expert advice could then be integrated into the folk pharmacology of the forum moving forward, enhancing the quality of advice being shared. This parallels observations for community-driven harm reduction norms noted in some ‘offline’ fitness spaces where ‘expert’ advice is sought out and integrated into broader community understandings (Gibbs *et al.*, 2022; Turnock *et al.*, 2023), though extended beyond the hardcore subcultural trainers noted in those works to others, owing to the ‘open’ nature of forum space.

While ‘expert’ advice sharing was significant in shaping the forum’s folk pharmacology, arguably the most impactful form of harm reduction observed was the norm of simply advising against use in circumstances

where an individual could easily fix the behaviours causing the issue they were seeking to address through peptide use. A clear example was the following reply to an individual who asked about using peptides to lose fat he had put on as a result of not training for some months following an injury:

‘Sounds pointless in my opinion. You know the behaviours which caused you to gain weight during the time you were recovering from your injury... Fix them and you’ll probably lose the weight’

This correlates with findings from steroid-related forums, where there was similar opposition to use when the poster was perceived as looking for a ‘shortcut’, or did not appear to be appropriately informed on drugs or training (Turnock & Townshend, 2022). Peptides were not a ‘miracle cure’, and were not a substitute for broader lifestyle changes such as eating well, or exercising with proper form.

Indeed, those who came on the forum asking for peptide advice without attempting to make such changes were often ridiculed by more established forum posters. This is illustrated by the following replies to an individual who had recently started lifting weights and was experiencing wrist pain, who asked about using TB-500 and BPC-157 to fix this issue:

‘Mega-dosing TB500 & BPC-157 for a little wrist pain 🤪. Fix your form or use wrist wraps!’

‘[He’s] missing out the Methyltren!^f’

While the forum often included positive discussion of novel peptides, therefore, established members nonetheless attempted to discourage use in cases where it was not perceived as appropriate, reflecting the philosophy of ‘less is more’ often seen in hardcore lifting cultures (Turnock, 2021a). With many of the posters with more established ‘reps’ coming from these subcultural backgrounds (i.e. bodybuilders/powerlifters), they were able to impart these norms of fixing training and lifestyle before drug use to less-informed trainers.

5.2. Limits to utility; not a ‘miracle cure’

While many posters suggested they found peptides beneficial for both injury rehabilitation and general wellbeing, a significant minority of posters discussed having used these drugs without any measurable positive effects:

‘Tried BPC for tennis and golfers elbow. Did absolutely nothing.’

Such posts were met with a variety of responses, including replies acknowledging that some product was worse quality, and should be avoided:

‘Like all the nasal spray variants of injectable peptides it’ll be more expensive, last half as long, be half the strength and your body won’t absorb it all, waste of time imo!’

Reflecting the unregulated nature of the market, posters further pointed to the degradation of peptides if not refrigerated as a potential issue with some sellers (particularly of nasally administered variants), as well as the potential for scammers to be selling ‘bunk’ products as ever more sellers entered this rapidly expanding market (explored below).

While forum users acknowledged the presence of some poor quality product in the market, however, a major factor highlighted regarding perceptions of peptides doing ‘nothing’ was the tendency for some users to expect peptides to be ‘miracle cures’, rather than aids to recovery:

^f Methyltrienolone is a potent steroid that is often joked about in online bodybuilding communities owing to its reputation for being extremely toxic, and presenting severe side-effects (see Turnock, 2021a: 15).

'if you want to recover you need to rest... Peptides like TB & BPC may encourage healing and reduce recovery time by a significant but not miraculous margin (say 25 %) - but only if all the other factors to aid recovery i.e. rest are in place.'

Indeed, in a thread where an individual shared his experience of using peptides to recover from a pectoral tear, the poster went on to detail how his physio had been astonished at the fast pace of his recovery, yet still commented that 18 months post-surgery he was nowhere near his pre-injury strength: *'For reference I could dumbbell press 44 kg for 8, now I've not pushed past 28 kg'*.

The perception of many forum regulars was therefore that less-informed users perceived peptides as 'miracle drugs' and expected rapid recovery, which was leading them to claim peptides "didn't work" when they didn't get the anticipated results. This may be linked to the marketing language used by some peptide sellers, where they are represented as having dramatic healing and wellbeing properties (see [Turnock & Gibbs, 2023b](#)), fuelling misperceptions that effects will be immediate and substantial. Illustrating the frustration that some forum regulars felt towards those who complained peptides did not work when they refused to rest or follow proper physiotherapy procedures, several posted sarcastic comments in response to an individual who claimed peptides had not helped him with a running injury, when he had not taken a break from training for a marathon to recover post-injury:

'What, you mean mega-dosing peptides won't suddenly cure perennial overuse injuries overnight? 🙄'

This reflects dynamics observed in steroid-using subcultures, where more informed users like powerlifters critique aesthetics-oriented trainers who experience negative effects using steroids, when they did not follow protocols for use and training considered 'best practice' among these hardcore trainers ([Turnock, 2018, 2021b](#); [Turnock & Townshend, 2022](#)). Critiquing those who went against community understandings of 'best practice' (regarding e.g. training, rest and recovery, diet and drug use) is thus a key tool in shaping the folk pharmacology of forum space, and cultural understandings of these emergent drugs as useful tools, but not 'miracle cures'.

5.3. Product quality and harm reduction

A final, significant area regarding community harm reduction information sharing related to product quality. As noted above, some posters raised concerns that certain suppliers were not selling legitimate product:

'I have seen loads of new sites popping up in the past two years; it has become the wild west. One seller I saw is selling a peptide called GHK-CU, a copper peptide which is always blue in appearance. This site has photo images of the vials and [it's] white powder, and he's got it labelled GHK-CU.'

[Weber et al. \(2017\)](#), conducting tests of seized doping products in Switzerland, noted that only 66 % of seized peptides contained the labelled substance, with 43 out of 146 samples containing inert product, and 7 a mislabelled compound (p.746). With [Kimergård et al. \(2014\)](#) also documenting substitution in the UK peptide market, product quality concerns appear to be well founded. Given the potential for harm if a substituted drug were used, especially one requiring different dosages and timing of injections, it is clear that advice regarding product quality was important for harm reduction, in addition to satisfying user desires to avoid wasting money on inert product.

Often advice regarding quality revolved around sharing links for sites considered to be 'good quality' suppliers, and warning users to stay away from those considered 'scams'. This matches norms observed for engaging with online IPED sellers elsewhere ([van de Ven & Koenraadt, 2017](#)), where recommendations and reputation are significant to determining which suppliers are engaged by buyers. The posting of links

to 'recommended' sellers must naturally be viewed somewhat critically, since it is possible that a given online pharmacy could be 'sponsoring' forum posters to promote their links, or 'sockpuppeting' with fake reviews to garner sales ([Gibbs, 2023b](#)). However, the sharing of community information regarding sites believed to be 'scamming' nonetheless played an important role in ensuring users did not order from retailers of potentially harmful compounds:

'It's worse than scamming. The peptides I bought (tb500 bpc157 and hgh frag) when mixed and left in the fridge went like a gluey-type sludge.'

Such information sharing could be particularly relevant in cases where products were substituted, and in one stark example an individual discussed the risks of buying black market GLP-1 peptides like semaglutide, warning users of the results from testing he had conducted:

'In our PhD lab we'd order [GLP-1 peptides] from China and run them on the HPLC/Mass Spec machines to check their integrity. One company ballsed it up so many times we went to a different supplier. The Amino Acids were in the wrong order.'

The role of forums as digital ecosystems where information such as test results can be shared has previously been observed in relation to steroids, where quantitative test results have fed into community reputation mechanisms used to guide buyers away from poor-quality product ([Turnock, 2021a](#)). This is most clearly embodied by the *Anabolic Lab* steroid testing service set up by *MesoRx* forum moderators to publish data on UGL steroid quality for potential users ([Andreasson & Henning, 2023](#); [Turnock & Townshend, 2022](#)). While no equivalent service appears to exist for peptides, the fact that independent posters were sharing cautions with forum users regarding their own independent testing demonstrates how harm reduction advice spread through this digital communal space. With illicit market semaglutide recently highlighted as a potential public health concern in the UK following hospitalisations ([Reuters, 2023](#)), it is clear that such information regarding the potential risks of particular substances was important harm reduction advice to publicise.

Advice regarding product quality could also take the form of general information sharing regarding how supply chains for these drugs work. With most peptides produced in China, and sold on to wholesalers in countries like the UK who apply their own labelling and packaging (see [Turnock & Gibbs, 2023b](#)), making less-informed buyers aware that much supposed 'pharmaceutical quality' product was sourced this way served as a means of communicating risk to these potential users. A clear example came from a thread where an individual stated he wanted to buy 'good quality' Melanotan II, and not 'Chinese generic'. When he enquired about a company that claimed to be UK based, this was met with the following replies:

'FFS You reckon it's been made by a UK pharmaceutical giant and repackaged by [reseller]? It'll be same as a Chinese generic because it is one!'

'All peptides will come from there. The lab you use will get their stuff from China. It's par for the course.'

This information, while 'common sense' to those involved in traditional hardcore IPED-using subcultures, is not necessarily known by those without such subcultural understandings, who may believe that a product which claims to be manufactured in the UK or EU has in fact been made in a pharmaceutical lab in this locale. With peptides increasingly promoted to those outside these traditional cultures (e.g. [Kolovos, 2022](#)), such knowledge exchange is significant in addressing information gaps between hardcore trainers and emerging 'wellbeing' users.

6. Discussion

Building on Van Hout and Hearne's (2016) research into women's use of CJC-1295 within online IPED communities, we provide a unique insight into the subjective experiences and lived realities of wellbeing peptide use beyond CJC-1295, as reported on a top UK fitness forum. Similar to a number of past netnographic studies, we have identified this forum as a hub for communal knowledge exchange and indigenous harm reduction (Hearne & Van Hout, 2016; Hearne et al., 2017; Van Hout & Hearne, 2015a, 2015b, 2016;) driven by relational trust and community dynamics between interested parties (Van Hout & Hearne, 2017). Our findings also highlight an emergent folk pharmacology of wellbeing peptide use by individuals of all ages, with different exercise levels, backgrounds, motivations, and experiences of use.

Motivations for peptide use in the current study are similar to the findings of Van Hout and Hearne (2016), which reported that women were motivated to use the peptide CJC-1295 for injury repair, rehabilitation, and anti-ageing. Key reasons to use peptides in our study were grounded in general subjective wellbeing with a particular focus on repair and injury rehabilitation and everyday aches and pains, as well as for their perceived anti-ageing properties. This is unsurprising given the increasing availability and marketing of peptides, such as CJC-1295 and BPC-157, as 'miracle cures' on mainstream e-commerce platforms (Turnock & Gibbs, 2023b) making them more visible, attractive, and attainable to those who may not be positioned within gym or IPED-using subcultures. This may indicate a potential normalisation of peptide use for lifestyle and wellbeing motives among broader populations who do not generally occupy digital subcultural spaces. This has implications for harm reduction as these individuals may not have a basic understanding of safe consumption compared to others who are embedded within online IPED communities where the sharing of ethnopharmacological knowledge between expert users exists (Turnock & Townshend, 2022; Underwood, 2017). Significantly, neophyte users may be unaware that these substances are unregulated and not subject to quality management therefore may be adulterated or include different quantities of the active substance, a different substance than stated on the label, or may have no active substance; posing health risks to those who are using them (Evans-Brown et al., 2009b; Graham et al., 2009; Kimergård & McVeigh, 2014).

Some older men were motivated to use peptides to combat ageing effects on both aesthetics/cosmetics and physical capabilities associated with a return to the gym and fitness environment. Furthermore, the use of peptides which were considered 'too risky' by some when younger, were now considering use for anti-ageing. This interplay between differing motivations is evident in the extant literature on older men who use steroids to enhance sexual function and emotional happiness associated with wellbeing and youthfulness when ageing (Christiansen et al., 2017; Harvey et al., 2022; Ip et al., 2015; Kimergård, 2015). Whilst our study focuses specifically on peptides, the change in motivations and perceptions of risk by peptide users in response to their needs at different times in their lives is significant. This has implications for healthcare providers who should consider age-specific tailored interventions and healthcare for those who are using peptides for repair, rehabilitation, and anti-ageing when older (Hearne et al., 2022).

Critically, we report that some wellbeing-oriented peptide users were motivated to do so as a result of perceived inadequate healthcare for a number of health conditions, which were negatively impacting their everyday wellbeing. The reluctance of people who use IPEDs, specifically steroids, to seek healthcare advice and a general mistrust in GPs is well-documented in the literature (Hope et al., 2015; Nice, 2017; Pope et al., 2004). Moreover, it is not uncommon for a man with strong masculine values to be reluctant to engage with healthcare and rather self-medicate what ails him or leave it untreated (Courtenay, 2000; Turnock & Mulrooney, 2023). As evidenced in our findings, perceived barriers to healthcare associated with poor wellbeing resulted in peptide-seeking via online black market channels or private anti-ageing

clinics abroad. Past research also reports this phenomenon whereby men who use steroids for perceived 'TRT' believe that their GP or other medical professionals lack the knowledge and understanding to appropriately address their wellbeing needs. HCPs are urged to engage in IPED-specific training to allow them to appropriately treat those who are motivated to use peptides for age-related repair, rehabilitation, and wellbeing (Hearne et al., 2022). This will reduce stigma and bridge the gap that exists between medical professionals and IPED users (Pope et al., 2004; Zahnnow et al., 2017) thus reducing black market purchasing and improving the health and wellbeing for the individuals.

Communal knowledge exchange and harm reduction discussions around 'best practice' and 'optimal' choices of peptides for specific purposes were supported by 'expert' advice and lived experiences of peptide use which resulted in the development of relational trust between forum members, thus influencing user decision making processes. Communal knowledge exchange was not only centred on the 'positives' of peptide-use but also on the possible negative effects from use such as their limits to utility and poor product quality. This phenomenon is evident among other populations of online communities for example NPS consumers on darknet marketplaces where sales are built upon trust and reputation (Barratt et al., 2014, 2016; Van Hout & Hearne, 2017; Van Hout & Bingham, 2013a, 2013b, 2014). Whilst this dynamic can be considered a form of communal knowledge exchange and harm reduction information sharing, it is worth being conscious of the reality that some forum posts in the current study may be by suppliers of peptides, who likely have alternative motivations for promoting or 'vouching for' certain substances. Gibbs (2023b) has noted this in relation to social media posts regarding specific steroid 'labs' and fictitious experiences of using steroid brands. The possibility for this to occur within peptide forum discussions therefore exists, although given how forum reputation systems work on relational trust and community dynamics (Turnock & Townshend, 2022; Van Hout & Hearne, 2016) it is likely to be less prevalent in these spaces than in spaces such as Facebook groups or other social media platforms, where such mechanisms are largely absent.

With the stark rise in discourse relating to peptides in recent years, it is clear that understanding user motivations and experiences of consuming these drugs is essential to addressing potential harms arising from their use. This article has offered significant contribution to this under-researched topic. However, it must be acknowledged that forums such as the one studied will naturally attract individuals who are invested in learning about the products they are taking, who seek out spaces which facilitate such learning. Consequently, further research into spaces such as social media platforms, and the peptide discussions happening in these spaces, including influencer advice, is needed to understand the experiences of broader user populations. Particularly with regards to semaglutide, which has been heavily discussed and promoted on social media platforms recently (Kolovos, 2022), such research is needed to ensure effective harm reduction provision.

CRedit authorship contribution statement

Luke A. Turnock: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Evelyn Hearne:** Writing – review & editing, Writing – original draft, Visualization, Validation, Investigation, Formal analysis.

Declaration of competing interest

The authors have no competing interests to declare.

Funding information

This research did not receive any specific funding grant from any

agency in the commercial, public or not-for-profit sectors.

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