

***“There’s no quick fix!”* Factors influencing rapid weight loss practices in Irish horseracing and the potential scope for change.**

Abstract

Despite safe methods of weight management being reported, adverse rapid weight loss (RWL) practices persist in horseracing. The aims of this study were to understand the factors that influence persistent RWL to ultimately develop potential solutions to ameliorate the associated issues. Semi-structured interviews were conducted with 33 participants representing relevant sectors of the Irish horseracing industry (jockeys n=15; trainers/owners/breeders n=7; health professionals n=6; racing officials n=5). Three higher order themes, each containing sub-themes were generated via reflexive thematic analysis: 1) Industry acceptance of RWL/wasting (broad awareness of the severity of RWL, RWL/wasting is part of the job, traditionalist attitude to jockey athletic identity) 2) Change is needed but will face barriers (alter minimum weight & claims, individualise minimum riding weights, implement mandatory education and supports for jockeys), and 3) Change requires a multifaceted, strategic approach (provide scientific rationale for change, industry wide approach is required). This study provides a comprehensive framework for understanding the factors influencing persistent RWL and provides potential changes to limit RWL. Implementing a multifaceted solution adapted to the context of horseracing is recommended, while industry agreement and endorsement of change by role models may facilitate change. Developing an evidence-based rationale should be priority to reduce RWL.

Keywords: Weight-making; occupational health; weight classification; rapid weight loss; riding weights; jockeys; support services

- Alongside social factors, environmental constraints prevent safe weight making
- An improved individual weight system alongside education and support may limit RWL
- Further evidence-based rationale is required to initiate adequate change
- The use of role models, incentivisation and rule changes may facilitate change

Character count: 40,594

1.0 Introduction

Horseracing is a global sport, which in Ireland has been reported to be worth 2.46 billion euro to the economy (Horse Racing Ireland and Deloitte, 2023). Races are competed in by thoroughbred horses often weighing over 500kg, and by their jockeys, who are positioned on the horse's back (Ryan and Brodine, 2021). Trainers, owners and breeders also play crucial roles in preparing horses for racing. There are two main types of racing, flat racing and national hunt racing, which is also known as jump racing. In flat races, horses race over relatively level terrain and have been reported to travel at speeds of up to 65 km/h while in national hunt, racing speeds are slightly slower due to longer race distance and the requirement for the mounted horses to jump hurdles throughout the race (Warrington *et al.*, 2009; Wilson *et al.*, 2014). The jockey's role is in controlling the horse's speed and navigating direction, which requires maximal physical output (Kiely *et al.*, 2020; Legg *et al.*, 2022). Central to the jockeys job is the requirement to align their body mass to the allocated weight of the horse they ride, which is lower in flat racing (54kg to 64.4kg) than national hunt racing (63.5kg to 76.2kg). The weight allocations can be determined by the horse's age, sex, and handicap rating, with higher-rated horses allocated higher weights in certain races to balance competitiveness. Jockeys have been reported to rely on non-scientific, anecdotal advice from peers to reduce their body mass, in a process known as rapid weight loss (RWL), or 'wasting' as it is colloquially known (Moore *et al.*, 2002; Dolan *et al.*, 2011; McGuane *et al.*, 2019). Moreover, apprentice and conditional jockeys may resort to RWL due to their weight 'claim', which means the horse's allocated weight is reduced to account for the jockey's inexperience. This 'claim' is reduced gradually from 10lbs (4.5kg) in flat racing and 7lbs (3.2kg) in national hunt racing based on the amount of wins accrued. Furthermore, unlike many other weight classification sports in which athletes commonly have time to regain weight post weigh-in before competing, jockeys compete at their lowest weight and must uniquely weigh-in post-race at the same weight, resulting in many jockeys competing while significantly dehydrated (Warrington *et al.*, 2009; O'Reilly, Cheng and Poon, 2017).

Jockeys worldwide have been reported to utilise a variety of RWL practices, including restricted fluid and energy intake, excessive sweating via saunas, steam rooms, baths, and through exercise, while flipping (intentionally vomiting), and consuming diuretics

have also been reported (Labadarios *et al.*, 1993; Moore *et al.*, 2002; Dolan *et al.*, 2011; Wilson, *et al.*, 2014; Jeon *et al.*, 2018). Jockeys have been widely reported to have poor bone health (Wilson *et al.*, 2014; Jackson *et al.*, 2017; Poon *et al.*, 2018), which has been linked to RWL practices (Dunne *et al.*, 2021). More acutely, jockeys have been shown to have reduced aerobic capacity (Dolan *et al.*, 2013), decreased maximal strength, and impaired simulated riding performance (Wilson *et al.*, 2013) following RWL. Moreover, jockeys reported RWL/wasting to be a prominent stressor with links to mental health disorders, levels of which are alarmingly high in this population (Losty *et al.*, 2019; King *et al.*, 2020a; 2020b). Conversely, no significant decreases to cognitive function have been observed and jockeys have been suggested to habituate to chronic weight-cycling (Cullen *et al.*, 2015). Efforts have been made by governing bodies to reduce the degree of RWL in Irish racing, such as the notice period for weight declarations extending from 24 to 48 hours, offering nutrition support, and in 2021, the closure of on-track saunas. Furthermore, an individualised minimum riding weight (IMRW) system was implemented for apprentice jockeys, in which a dietitian reviews the body mass, body composition and hydration status before agreeing on a suitable IMRW with the senior medical officer. Despite these changes, alongside evidence that for some jockeys, safe and effective methods of weight management are possible (Wilson *et al.* 2012a), harmful RWL practices persist.

A reluctance to implement safer methods has been reported amongst jockeys (Martin *et al.*, 2017) which is evidenced by the research by Dunne *et al.* (2021), who reported that prior to on-track sauna closures, 34% of Irish jockeys employed RWL every 48 hours, while 71% reported commencing RWL less than 36 hours before racing. Moreover, 59% of jockeys used saunas, while 52% used baths and 48% exercised wearing sweatsuits. Reasons for the persistent use of RWL practices are not fully clear, although Martin *et al.* (2017) suggested a failure to recognise jockeys as athletes and the demands they face among industry stakeholders as a contributing factor. McGuane *et al.* (2019) reported that RWL is an accepted practice among jockeys, as it is perceived as an in-group behaviour and therefore integral to the identity of a jockey. While these cultural and social factors may play a role in persistent RWL, the environmental constraints jockeys operate within must also be recognised, such as the workload/racing frequency and the weight demands, potentially among others. More recently, Legg *et al.* (2023) reported a concerning lack of uptake of a specific exercise training programme among

66 apprentice jockeys, and the reasons cited were related to the high workload demands
67 jockeys face. This highlights a need for environmental restructuring to allow for
68 improved practices to be implemented. While various reasons have been suggested to
69 contribute to a lack of change to weight-making practices, the continuation of RWL
70 signals the need to further understand all of the contributing factors through a
71 comprehensive framework. This is a vital requirement, as when aiming to devise
72 suitable solutions to change behaviour, all influencing factors must be considered in
73 unison (Albarracín, Fayaz-Farkhad and Granados Samayoa, 2024).

74 The congested and protracted racing season results in some jockeys competing in up to
75 25 races per week across 5 meetings, totalling over 700 races per year (Horse Racing
76 Ireland, 2022; 2023), which are often at different riding weights, likely contributing to
77 the use of RWL. Moreover, despite suggestions to increase the minimum weight in flat
78 racing (Warrington et al., 2009; Wilson et al., 2020), the lack of change is particularly
79 concerning and highlights a possible industry-wide reluctance to change. Records from
80 the Racing Academy and Centre of Education show that between 1978 and 2021
81 average trainee weight has increased by 48.6%, from 37kg to 55kg (RACE, 2022),
82 while minimum riding weight in flat racing has increased by just 13.2%, from 47.7kg to
83 54kg, with a recent 1.36kg increase occurring in 2021. Not all trainees become
84 professional jockeys, yet this is an indication of the disparity between the change in
85 jockey weight and the weight requirements, which is further compounded by the high
86 growth rates of Irish adults (Boylan *et al.*, 2014). A key factor related to this lack of
87 change may be the welfare of the horse, as increased weight may put increased demand
88 on the horse (Dyson *et al.*, 2020), thus presenting a balancing act between the wellbeing
89 of the horse and that of the jockey. Given the current weight requirements and the high
90 frequency of racing, environmental conditions are created in which some jockeys may
91 feel RWL is a necessary behaviour. It is clear that due to the complexity of the topic, the
92 continued practice of RWL and the likelihood of the problem worsening, further
93 understanding is required. The aims of this study were therefore, to provide a
94 comprehensive, industry perspective of the factors that influence persistent RWL,
95 ultimately as a precursor to develop potential solutions to mitigate these behaviours.

2.0 Methods

2.1 Study design

The design of this study was guided by an interpretivist philosophy, grounded in the belief that reality is shaped by individual perspectives through ontological relativism, and that knowledge is co-constructed by the participants and the researchers through epistemological constructionism (Slevitch, 2011; Erlingsson and Brysiewicz, 2013; Rehman and Alharthi, 2016). This interpretivist approach allows for effective exploration of complex social phenomena where participants' subjective experiences play a crucial role (Cohen, Manion and Morrison, 2000; Rehman and Alharthi, 2016). This is particularly relevant in the context of weight-making in horseracing, where individual experiences and perceptions can vary widely. In employing this philosophy, an exploratory semi-structured interview study design was created (Kallio *et al.*, 2016). This enabled an open exploration of the complex topic of weight-making in horseracing and facilitated participants in conveying their nuanced experiences.

2.2 Participants

Thirty-three participants from various categories of the horseracing industry were recruited to obtain a comprehensive understanding of the topic (Martin *et al.*, 2017). Participants were recruited via quota sampling to gain a sample which is representative of the various categories (Etikan and Bala, 2017). Recruitment took place in person at race-meetings, a method commonly used in this population (King *et al.*, 2020a; 2020b). Inclusion criteria were defined as two years professional experience with any or all of: personal experience employing RWL, supporting jockeys via medical/sports sciences, and/or governance of the riding weight structures. The sample comprised jockeys (J; n=15), trainer/owners/breeders (TOB; n=7), health professionals (HP; n=6), racing officials (RO; n=5). Jockeys were represented by all cohorts; apprentice flat jockey (n=1), fully licensed flat jockeys (n=9), conditional national hunt jockey (n=1) and fully licensed national hunt jockeys (n=4). Participants' ages ranged from 19 to 73 years old at time of data collection.

2.3 Ethical considerations

As part of the ethical approval process, a risk assessment was carried out to identify ethical concerns. Potential risks to confidentiality were identified, and measures were implemented to collect strictly minimal information on participants (Morse and

Coulehan, 2015). A participant information sheet was provided to each participant which outlined the purpose of research, the risks involved, the intended use of data and the relevant rights as a participant. All participants were required to read the information sheet, and upon choosing to take part, each participant signed a written informed consent form prior to data collection. Ethical approval for this research was granted by (removed for anonymity).

2.4 Data collection

Semi-structured interviews were chosen as the data collection method due to the exploratory nature of this approach. A mandatory eight fixed questions were posed to all participants, with following probing questions where necessary. Questions were based on findings of previous literature on the topic and various industry specific topics (Dolan *et al.*, 2011; Wilson, *et al.*, 2014; Martin *et al.*, 2017; McGuane *et al.*, 2019). Topics covered included RWL practices and their effects, the culture of RWL, the current weight classification system, education and support services, individualised minimum riding weights, proposed changes, and barriers and facilitators to change. To ensure that each participant had knowledge of the topics of discussion and to bolster credibility of the data, an initial briefing was given on RWL and the reported effects, information on the current minimum weights, the IMRW system, and the education and support services. A conversation style, often using colloquial terms was used during the interviews to build rapport and to ultimately facilitate the participants' detailed expression of their feelings and experiences (Flick, Von Kardoff and Steinke, 2004; Newcomer, Hatry and Wholey, 2015). Due to the organic nature of the conversation, each interview took a unique direction toward the areas the participant felt were most important (Braun and Clarke, 2006). The interviews were performed in person (n=27), via video call (n=4) or via telephone (n=2), depending on the most convenient method for the participant. All interviews were performed by the lead researcher, who presented as an academic with practical experience, therefore was likely perceived as knowledgeable on the topic. Data collection ceased when the authors were satisfied that no new information relevant to the research aims was provided (Malterud, Siersma and Guassora, 2016). The interviews lasted on average 24:55 $\pm$ 10:20 minutes (13:05-38:53 minutes). Interviews were recorded and later transcribed for analysis using the intelligent verbatim method, which captured essential dialogue while omitting elements such as filler words and non-verbal sounds.

2.5 Data analysis

Reflexive thematic analysis (Braun and Clarke, 2006; Clarke and Braun, 2013) was chosen as the method for data analysis. Familiarisation of interview data began during the data collection phase and through the first phase of listening and transcription. Each data item was given equal attention in the first phase to achieve a thorough and comprehensive analysis of all data. Immersion in the dataset was achieved through listening to interview tapes and reading interview data in multiple phases. Written notes were taken throughout the analysis phase which aided depth of understanding through identifying patterns relevant to the research questions. Inductive, semantic coding was completed in *Nvivo 12 (QSR International Ltd., 2012)*, as part of an iterative cyclical process throughout the immersion and analysis phases, as opposed to a strict linear process. Coding began by listening to recordings and reading transcriptions while tagging data items with clear, descriptive titles. Codes were initially labels of data items that were relevant to the research aims. The initial coding phase was broad, and many codes were created, before subsequent phases, in which codes were refined and collated into groups according to relevance. Themes were generated not based on quantifiable measures but rather based on immersion in the data set and subsequent judgement regarding the significance of data items. Once initial themes were generated, they were reviewed, and all data items were again analysed for any missed themes and to ensure accuracy of representation within current themes. This process occurred multiple times to produce a final list of themes and sub-themes (Connelly, 2016).

2.6 The researcher's position and reflexivity

In employing the constructivist philosophy, the lead researcher played an active role in the knowledge creation process, therefore the following section provides insight into this for transparency. The lead researcher's understanding of the topic was formed through three main sources: 1) thorough analysis of previous research, 2) applied experience providing sports science support for jockeys and 3) personal connections with individuals who are involved in the horseracing industry. These sources have shaped the research and enriched understanding of the complexity of weight-making, the colloquial terminology and facilitated building rapport with participants. The analysis of literature and applied experience enriched understanding of the physiology of weight-making, thereby developing the worthiness of the topic. The insight gained from personal connections within the horseracing industry afforded an insight into the

194 realities and challenges faced by those involved in multiple sectors of the horseracing
195 industry, from various perspectives. This influenced the study design and chosen
196 methodology, evidenced by the broad sample and by the iterative analysis process.

197 A bracketing technique was used throughout the planning, conducting, and reporting of
198 this research to identify the lead researcher's personal ideological assumptions and to
199 understand how these may influence the research (Chan, Fung and Chien, 2013).

200 Alongside this, communication with members of the research team was consistent
201 through each stage of the research process to maintain transparency and evaluate the
202 potential impact of any assumptions. This process allowed for greater clarity in the
203 undertaking of data collection and analysis and strengthened the quality of decision
204 making throughout the study, therefore developing the trustworthiness of the findings
205 (Anderson, 2010; Connelly, 2016). Furthermore, prior to data collection, three separate
206 pilot interviews (with a jockey, an ex-trainer and a health professional) were undertaken
207 and recorded. These were reflected upon to refine the language used and question
208 structure. This process allowed for the development of questions that encouraged rich,
209 nuanced responses from participants. While it is impossible for a researcher to
210 completely detach from their theoretical and epistemological predisposition (Braun and
211 Clarke, 2019), these measures taken to maintain reflexivity ensured awareness and
212 sincerity throughout the research process (Smith, Sparkes and Caddick, 2014).

213 **2.7 Theoretical perspective**

214 The current study uses an interpretivist philosophy to explore the phenomenon and
215 applies the theory of planned behaviour (Ajzen, 1991) to understand these factors as
216 determinants of behaviour. The theory of planned behaviour posits that an individual's
217 intention to perform a behaviour is the primary determinant of that behaviour, which is
218 influenced by three key components: attitudes to the behaviour, subjective norms, and
219 perceived behavioural control. While the study took an interpretivist approach to
220 understand the topic comprehensively, results are discussed with reference to this
221 framework to provide comprehensive understanding and to assist policy makers aiming
222 to initiate change (Albarracín, Fayaz-Farkhad and Granados Samayoa, 2024).

3.0 Results

Results are presented and discussed in a narrative manner using quotes from participants to denote the perceptions of the overall sample. Within the three main topics of discussion, three higher order themes were generated, further consisting of lower order themes, all of which are displayed in Table 1. Thematic matrix. For the purpose of expressing participants feelings accurately, RWL is commonly referred to as ‘wasting’ in this section.

Table 1. Thematic matrix

Topic	Higher Order Theme	Lower Order Theme
RWL/Wasting	Industry acceptance of RWL	Broad awareness of the severity of RWL/wasting
		RWL/wasting is part of the job
		Traditionalist attitude to jockey athletic identity
Riding Weight and Support Structures	Change is needed but will face barriers	Alter minimum weight & claims
		Individualise minimum riding weights
		Implement mandatory education and supports for jockeys
Scope for change	Change requires a multifaceted, strategic approach	Provide scientific rationale for change
		Industry wide approach is required

3.1 Industry acceptance of RWL

3.1.1 Broad awareness of the severity of RWL/wasting

Participants from all categories were aware that RWL (wasting) was a process in which ‘basically you starve yourself, you dehydrate yourself, take whatever actions you need to take, and you end up in a suboptimal, physical state as a result’ (RO3). Though some participants noted minimal effects, potentially due to the lesser experience with RWL, the physical effects were commonly described as fatigue related, recalled as a situation in which ‘I fell off, my legs just went!’ (J01). Diminished mood was noted as a common mental effect, in which one’s ‘headspace isn’t right’ (J13). Contrasting views were apparent when participants discussed the effects of RWL on performance, in which some indicated negligible effects: ‘I rarely remember thinking you’ve lost so much weight and that’s why you didn’t win’ (J02), commonly justified based on the perception that while racing, ‘adrenaline kicks in’ (J08). Others were adamant there was an impact, feeling ‘there’s no doubt it effects performance because you don’t think as sharp when you’re dehydrated, it’s just fact.’ (TOB6). Given the broad sample, direct experiences with RWL varied greatly among participants, resulting in diverse perceptions of the

effects. However, in general RWL was still regarded as a severe problem within horseracing, so severe that *'if you checked them [jockeys] getting off scales it'll be closed down, racing will be stopped, because they're all too light'* (TOB3). Various observations of alarming RWL cases were provided highlighting a broad awareness of the severity, as illustrated by the following quote:

When I used to work in a different yard, there were a couple of young apprentices there and they'd be sucking out of sponges. They hadn't drank anything for like two, three days, doing manual work and like, passing out (J15).

The positive impact the closure of on-track saunas has had, was mentioned: *'I think it's made lads more aware [of safer methods]* (J08). This was not the case for all, as some jockeys who may lack means or understanding to gradually reduce their weight may be at a disadvantage *'because they're going to be dehydrated for longer now'* (TOB3).

3.1.2 RWL/wasting is Part of the Job

Many participants felt RWL was *'just part of the job'* (TOB1) for most jockeys and due to the concerning low minimum weights, it was suggested that *'80% of jockeys couldn't do it (minimum weight)* (J09) without using RWL. However, when probed, some participants were aware of possible healthier methods, noting *'you don't have to starve yourself, you just have to eat the right foods, drink your water'* (J01). This suggests that for some jockeys there may be a lack of desire to engage with alternative methods, or a lack of access to them, or both. When asked about the sources of information on RWL, a common source was *'just other jockeys really. Just ask them how they do it and they tell you straight up. There's no other ways around it, to be honest'* (J03), yet this highlights that some jockeys feel that traditional methods of RWL are the only possible means of meeting the weight demands. Given the increase in evidence on proven methods of safe weight-making in recent years, health professionals were frustrated that jockeys were still the primary source of information noting, *'just because you were a jockey 20 years ago and this is what you did, that doesn't make it right now'* (HP1). The influence of peers provides a strong indication that many jockeys see wasting as a normal part of the job of a jockey. Evidence of this strong peer influence can be seen in the following quote, in which rapidly losing a relatively large amount of weight is seen as a means of achieving social approval:

279 You get into the sauna and that's the question - 'Well, how much have you to go?
280 If you get in say just a pound, they're like, 'Oh ok.'. Whereas if someone says
281 he's three or four to lose, they're like, 'Good man!' and they're driving you to get
282 it off instead of being like, 'Why did you leave yourself for three or four pounds?
283 (J08).

284 The desire for opportunity was also seen as a contributing factor, as if a trainer/agent
285 was to *'ask a young lad can you do nine stone, claim 10. The first thing he says is*
286 *yeah... No one wants to say no to a ride because rides are hard to come by' (TOB1).*
287 Furthermore, due to the frequency of racing, jockeys receive notification of their
288 allocated weight just 48 hours before racing. This short window of time jockeys have to
289 make weight was also noted as a contributor.

290 Ultimately, they get to a point where they're given, until very recently, 24 hours'
291 notice that they've to do a certain weight on a certain day and then they're left with
292 no choices to take the measures they take! (TOB7).

293 Despite the notion that safer methods of weight loss may be possible, jockeys may not
294 be motivated to seek out alternative methods, due to influence of peers and tradition.
295 Moreover, many participants recognised that change may simply not be possible in the
296 current environment due to the demands of the job (weight requirements, racing
297 frequency), perceived level of supports, and jockeys' desire for opportunities.

298 3.1.3 Traditionalist attitude to jockey athletic identity

299 Unlike many other sports, it is often the perception that the horse is the valuable
300 commodity in horseracing, therefore there is a perception there are *'two athletes here,*
301 *the jockeys and the horses' (ROI)*, which may complicate the perception of jockeys as
302 athletes, as evidenced in the quote below:

303 Horseracing has a very big business attached to it. So from a business sense, they
304 are parts and tools of the business, but from a sporting point of view - yes, of
305 course they are athletes... but it's funny if I ask myself, do I perceive them as
306 athletes? Possibly not, no. I don't, and I don't know why. Maybe I would see them
307 as tradesmen, as opposed to being athletes, which of course they should be, and
308 they are. (TOB2)

These misconceptions around jockey athletic identity were common and may influence the care jockeys receive, thus contributing to the perception: *'Would I consider myself an athlete? I don't know, I don't think we're treated like one'* (J06). The treatment jockeys receive upon entering the sport was elaborated on, and their weight claim was referenced as an example: *'they're thrown to the wolves, used and abused for their claim and working'* (TOB4). Trainers and owners in particular were cited as being *'old school'* (J07) in their views and thus described as barriers to change in this domain. The treatment jockeys receive was linked to the practices they employ: *'I think if we were treated like athletes, a lot of people will start acting like them'* (J08). When attempting to understand the lack of industry change it was clear that a general traditionalist attitude was a barrier. Horseracing is a traditional sport, proudly holding on to some of its original rules, values, and customs, although a negative side effect of this is the traditionalist attitude to change, as *'it can be hard to change or to get people to take on a new idea or concept. By its nature, racing is a traditionalist type of sport, the people involved tend to be traditionalist'* (RO1). It was clear that participants felt that a general traditionalist attitude to change influences the disparity around recognition of jockeys athletes and their needs, thus influencing the continued practice of wasting.

3.2 Change is needed but will face barriers

3.2.1 Alter minimum weight & claims

A common suggestion was the need to increase the minimum weights, as *'obviously kids are getting bigger. So especially for the flat, I would say the weights do need to go up'* (J08). Due to several barriers, there was a feeling that *'you can't keep raising the weights'* (J08). Participants noted that there will always be relatively heavy jockeys who will attempt to make the raised weight, and ultimately *'it's a never-ending cycle. The nature of the beast is to try and do lighter than they should'* (TOB4). Also commonly detailed was the important factor that *'some very light lads will oppose it because that's the way they get rides'* (J08). Notably, there was a *'fear that asking horses to carry higher weights has welfare implications'* (RO1) although it was recognised that *'every morning on the gallops horses carry a lot heavier than they do in races'* (J03). Owners or breeders were flagged as potential opposition to any weight rise as the extra weight was seen as *'slowing them down, affecting the speed timings for sales'* (TOB4). The final barrier to increasing weights was the unescapable fact that weight classifications in Irish racing must align with other racing nations.

342 So you have some of those authorities saying, well, we don't need to put our weight
343 structures up. So it's to get acceptance from racing authorities that there should be a
344 uniform weight structure across the world **(RO5)**.

345 When looking at the claim system specifically, a prominent suggestion for flat racing is
346 to '*get rid of the 10lb claim, just go with seven*' (TOB1). No barriers were noted to this
347 proposed change. Given an increase in the minimum weight was introduced
348 immediately prior to the data collection period, desire for an increase to minimum
349 weights may have dissipated for some participants, although multiple barriers will
350 prevent major change in this area.

351 3.2.2 Individualise minimum riding weights

352 A suggestion to limit RWL was to provide each jockey with an individualised minimum
353 riding weight (IMRW) that they cannot ride below. Views on this proposed change
354 were polarising between jockeys and non-jockeys. Many non-jockeys felt that this was a
355 suitable solution, as particularly '*from a health, strength, fitness, and mental health*
356 *point of view, setting a minimum weight is essential*' (HP1). Conversely, this method
357 was met with concern from jockeys, as it was seen as '*the wrong thing to stop someone*
358 *from doing a job they want to do*' (J02). A strong barrier to the potential introduction of
359 an individualised weight system was that it would be too restrictive and if implemented,
360 would cause many jockeys to lose riding opportunities, which are already difficult to
361 obtain for many jockeys. A common reaction to this proposed change is highlighted in
362 the quote below:

363 You're telling me I can't ride that horse, and I know if I sweat I could ride it, and
364 some other f*****'s riding it instead of me?! Massive opposition - I'd say the
365 whole jockeys association would weigh-in on that. I don't agree with the fact that
366 lads should get extra opportunities just because they're light. It's sport, it's
367 performance based! **(J11)**.

368 Some participants were not aware of this method as it's currently used with apprentice
369 jockeys only, although from those aware, it was noted that some apprentices had simply
370 engaged in RWL prior to assessment and provided tampered hydration samples, thus
371 this method was seen as '*not worth a s***e if it's not done properly*' (J15). Others could
372 see potential in this, noting '*it's a great idea to monitor them*' (HP6). Given jockeys

373 fluctuate weight frequently, many participants were enthused by the possible benefits a
374 monitoring system may bring.

375 I think there should be a quarterly screen where they're expected to meet
376 requirements, so that they don't ever go too long without letting themselves slip.
377 There's also opportunities for jockeys to be told, this is where you need to
378 improve. I think they will become naturally more educated then **(TOB7)**.

379

380 Regardless of the proposed flexibility, in its current form, the IMRW system in place
381 for apprentices was not seen rigorous or reliable enough to implement for all jockeys. It
382 was clear that the solution would require input from jockeys to create *'agreement to do*
383 *it in a way that helps rather than hurts them (RO2)*.

384 3.2.3 Implement mandatory education and supports for jockeys

385 A popular suggestion for change across all categories was to implement *'mandatory*
386 *workshops on education' (HPI)* for jockeys on methods to lose weight safely, as
387 ultimately *'they just need to be educated how to actually sweat or make weight in a*
388 *short space of time, in a healthy way' (J04)*. This call for education for jockeys was the
389 suggested change with most support and no notable barriers were mentioned.
390 Awareness of the current support services was mixed, while among those aware,
391 particularly jockeys, there was a desire to *'make the services better (RO4)*, suggesting
392 that the current supports are inadequate. Moreover, the disjointed nature of the current
393 support structures was recognised as a problem, and the level of care jockeys receive
394 was compared with other sports.

395 It's so disjointed in racing, there isn't that cohesiveness. So I could see a role like a head
396 of performance services like what they're doing in the GAA; someone that will be
397 qualified in the area and understands the sport' **(HP5)**.

398 A strong suggestion was to *'have a full-time nutritionist available to all the jockeys on*
399 *an ongoing basis' (TOB5)*, although the demands of the job were seen as a potential
400 barrier to engagement, as the *'system at the moment doesn't afford them an opportunity*
401 *to step away without feeling they're going to miss out' (TOB2)*. The possibilities of
402 improved support services were discussed, and many ideas were suggested although
403 quite prominent was a suggestion to create a *'centre of excellence that people can come*
404 *and stay, rehabilitate and get all the advice they need' (HP3)*. Ultimately, the possibility

of implementing mandatory supports had resounding support particularly from non-jockeys, although importantly, *'it needs to be something that's flexible that can be suited to the work of the jockey'* (HP3). No single solution was mentioned that would overcome the multitude of issues associated with RWL although it was evident that to make sustainable change, the solution must be *'a combination, there's no quick fix!'* (TOB4), therefore integrating education and support may be a suitable solution, if modified to the context.

3.3 Change requires a multifaceted, strategic approach

3.3.1 Provide scientific rationale for change

When asked what may facilitate change, a strong majority recommended providing *'substantial evidence'* (J05) as rationale for change. Changing the minds of those in opposition to change was cited as key reason for developing a deeper evidence base, as it was clear that many felt that those in powerful positions were barriers to change, underlined by the following quote: *'some of those people are in influential committees and are quite loud voices and we haven't got the science to necessarily challenge them'* (RO2). Using rigid scientific evidence was commonly suggested particularly as a method to inform trainers on the negatives of RWL, as *'trainers are putting pressure on big name jockeys, maybe to ride at lesser weight'* (RO3). Further research on the potential ill effects of chronic RWL was a common suggestion from participants of all categories. Many felt that there was a strong need for research on *'the health and wellbeing of the participants i.e. us (jockeys) and show the facts and figures'* (J05), to those in opposition. Furthermore, it was clear that more work is required to provide rationale for, and to devise an adequate solution, particularly when aiming to create individual minimum weights as it must be done *'through a scientific based, fair manner'* (RO2). Further evidence on the ill effects of RWL on the jockey are clearly sought, particularly evidence of *'what level of hydration is considered safe'* (TOB3). Ultimately, developing a rigid base of scientific evidence on both the effects of RWL and the potential positive impact of safer weight management methods was determined as requirement to facilitate change within the sport.

3.3.2 Industry wide approach required

Ultimately, due to the complex nature of this topic, to make adequate change it was suggested that *'the legislators have to come together and decide that this is a safety*

438 *issue'* (HP3). Horseracing is governed by multiple bodies, therefore a strong suggestion
439 for all stakeholders to come together to ensure '*alignment, because at the moment, we're*
440 *not aligned. We all have great ideas, but nobody wants to push everything together, the*
441 *same message'* (HP1). This alignment relates to regulators, healthcare professionals and
442 those competing in the sport (jockeys, trainers, owners/breeders), as due to multiple
443 barriers noted to each individual change, an agreed upon comprehensive change is
444 required. To facilitate change it was clear that due to the strength of peer influence, it
445 would be wise to involve '*a champion amongst the jockeys and I don't mean the*
446 *champion jockey. I mean somebody who is very well-respected amongst the jockeys,*
447 *who has had, or is having a good career and sees the sense in this'* (HP6), to promote
448 change. Framing change as beneficial to the jockey was cited as vital when promoting
449 safer methods, which may incentivise change: '*framing it in a way that they will benefit*
450 *financially'* (TOB7). Ultimately sustainable change may be achieved by '*writing it into*
451 *the rule book'* (HP3). This furthers the need for altering the jockey job structure as a
452 whole to allow for safer practices to be implemented.

4.0 Discussion

The findings from this study demonstrate that the challenges associated with jockeys' adverse weight-making practices are complex and are driven by a myriad of social and environmental factors, and thus the solution must be multifaceted. The initial aim of this study was to provide a comprehensive, industry perspective of the factors that influence persistent RWL, ultimately as a precursor to developing potential solutions to mitigate these behaviours. In doing so, it was found that there was an industry wide acceptance of RWL, despite awareness of the potential impact on hydration levels (Warrington *et al.* 2009; O'Reilly, Cheng and Poon, 2017), fatigue levels (Poon *et al.*, 2018), mood (Caulfield and Karageorghis, 2008; Wilson *et al.*, 2012b, 2013; King *et al.*, 2020b), and performance (Wilson *et al.*, 2014; Cullen *et al.*, 2015). Despite various calls for intervention, and subsequent education and support services being made available, many jockeys still rely on other jockeys as sources of information on weight-making, reinforcing the notion that jockeys operate within what was previously described as an 'insular world' (King *et al.*, 2020a, p.7) and the practices are socially driven and thus passed on from within the jockey guild (Dolan *et al.*, 2011; McGuane *et al.*, 2019). Moreover, these findings highlight lack of change over time (Labadarios *et al.*, 1993; Moore *et al.*, 2002; Dolan *et al.*, 2011; Wilson *et al.*, 2014; Dunne *et al.*, 2021) and indicates jockeys may be reluctant to change (Martin *et al.*, 2017), thus confirming the rationale for a further understanding of persistent RWL as a necessary precursor to defining suitable changes.

The influence of peers seen in the current study underscores the interpretations by McGuane *et al.* (2019) who detailed that the desire for jockeys to align with in-group norms to reaffirm their identity as a jockey is a reason for the acceptance of RWL, a factor seen across many weight making sports (Noonan-Holohan *et al.*, 2024). The findings of the current study accentuate the strength of this social influence by adding that RWL is encouraged due to the social approval gained from extreme levels of weight loss, while also highlighting that some jockeys may also feel pressured to achieve low weights to obtain opportunities. Alongside this, a general traditionalist culture was recognised to influence a disparity around the recognition of jockeys as athletes, building on points made by Martin *et al.* (2017). This traditionalist perception of jockeys as non-athletes seems to blur the recognition of RWL as a problematic behaviour and impacts a perceived general lack of care for jockeys within the industry.

Drawing upon the theory of planned behaviour (Ajzen, 1991), collectively these social factors can be viewed as key determinants of persistent RWL behaviours. The desire for both social validation from other jockeys and the desire to appease trainers needs contributes to a subjective normalisation of adverse RWL practices and alters the attitudes to the behaviour as potentially beneficial, despite awareness of the negative health-impacts. Both of these factors influence a lack of intention to change and are facilitated by the environmental structures.

The findings of the current study provide insight into the environmental, structural constraints and recognises these determinants of continued RWL. Findings show that the low weight requirements, coupled with the frequency of racing create a situation in which many jockeys must lose weight, often within a 48-hour window, and with no perceived available alternatives, jockeys feel no choice but to figure it out for themselves, amongst themselves. This highlights a perceived lack of control over their behaviour, which is another key behavioural determinant described by Ajzen (1991). To meet the low weight demands, 34% of jockeys were reported to employ RWL every 48 hours, while 71% reported commencing RWL less than 36 hours before racing (Dunne *et al.*, 2021). It is clear that many do not feel implementation of proven methods of safe weight-making are possible in the current environment and thus may see no choice but to employ traditional strategies to make weight, highlighting a need for these environmental constraints (weight demands, racing calendar, availability of supports and education) to be assessed. This is in agreement with Legg *et al.* (2023) in which similar recommendations were provided to increase jockey engagement in a specific exercise regime, as workload was a key barrier.

When using the theory of planned behaviour (Ajzen 1991) to understand jockey RWL, collectively it appears the social factors (desire to self-identify as a jockey, to gain validation from other jockeys, pressure from trainers, lack of recognition as athletes), alongside the environmental factors (weight demands, frequency of racing, perceived lack of alternative methods), influence a lack of intention to change among jockeys. As a result, RWL practices continue, further influencing the acceptance and normalisation of RWL, in a self-perpetuating cycle. These insights provide a novel comprehensive framework understanding the behavioural determinants of jockey RWL and thus develops understanding of weight-making in horseracing. This conceptualisation of persistent RWL should inform regulators in devising behaviour change strategies which

aim to limit and diminish RWL in horseracing (Ajzen and Schmidt, 2020; Albarracín, Fayaz-Farkhad and Granados Samayoa, 2024). The secondary aim of this study was to develop potential solutions to mitigate RWL behaviours. Given the complex range of factors influencing RWL, it is evident that any effective solution must be multifaceted, involving safeguarding structures, education, and supports. A common recommendation to limit RWL in previous research has been to increase the minimum weights (Warrington *et al.*, 2009; Wilson *et al.*, 2020) yet in the current study, specific barriers were explained, relating to alignment with international standards, and horse welfare concerns, although it was noted that horses carry more weight daily, during training. Moreover, it was recognised that jockeys will always attempt to make lower weights, as a means to gain an advantage (Burke *et al.*, 2021). For these reasons, an increase to minimum riding weights may not limit RWL amongst jockeys although alterations to the claim system may be possible, which may reduce RWL for apprentice jockeys.

Contrasting views were apparent in relation to the potential introduction of an IMRW system, particularly between jockeys and non-jockeys, yet with increased rationale and rigour in the system, this option should be considered. Previous research has shown that unless there is some form of environmental restructuring in the form of weight loss limits, RWL practices will continue (Alderman *et al.*, 2004). An individualised weight system was implemented in college wrestling, alongside education (Oppliger *et al.*, 1995) and appeared to be successful in reducing the degree of weight lost for competition and prevented subsequent unhealthy RWL behaviours (Oppliger *et al.*, 1998; 2006). A similar protocol may be developed and tailored to the context of jockeys, possibly using the jockey specific bodyfat equations proposed by Dunne *et al.* (2020) although the findings of the current study indicate this must be perceived as fair to jockeys and continuous monitoring is desired, potentially in combination with other changes.

The call for education on weight-making for the industry is a finding that aligns with much of the previous research on the topic (Wilson *et al.* 2014; Jackson *et al.*, 2017; Martin *et al.* 2017; Poon *et al.*, 2018; McGuane *et al.* 2019; Legg *et al.*, 2023) and is advised as part of a multifaceted solution. As noted by Legg *et al.* (2023), educating jockeys on the athletic requirements of riding and the impact of RWL may increase uptake of safer, healthier practices, though it should be noted that education should be

focused on healthy weight-management, as opposed to weight loss. Moreover, education for the wider industry on the requirements of a jockey's job may increase recognition of jockeys as athletes, thus improving standards of care and allowances within their schedule to engage with alternative methods of weight management. Increasing support services was a key recommendation in the current study, and based on the positive results of a jockey-specific nutrition and training intervention (Wilson *et al.*, 2012a; 2023), implementation of a similar form of support, with a specific focus on nutrition, should be considered in combination with other suggestions. Furthermore, given jockeys' lifestyles are unique, jockeys have been reported to value advice from peers over health professionals (Dolan *et al.*, 2011). Therefore, this multifaceted solution must be developed by those with understanding of the challenges jockeys face and thus modified to context jockeys operate within, ultimately to build buy-in (Sundgot-Borgen *et al.*, 2013).

Efforts should be aimed at apprentice jockeys initially as younger athletes are more vulnerable to RWL's effects during physical development (Lakicevic *et al.*, 2022). It was apparent in the present study that further evidence on the harmful effects of RWL is required to rationalise change and add rigour to the IMRW system, therefore future research should aim to provide further evidence on the physiological effects of RWL. Findings of the current study suggest that an industry-wide effort should firstly be made by aligning relevant regulators and stakeholders to devise a comprehensive strategy for change. In endeavouring to facilitate change, capitalising on peer influence through the promotion of healthy weigh-making practices by influential role models (Martin *et al.*, 2017), alongside incentivised engagement, is recommended. This study is the first to comprehensively evaluate industry perspectives on the scope for change to mitigate RWL in horseracing.

4.1 Strengths and limitations of the study

In efforts to provide comprehensive in-depth understanding of the topic, a wide sample of participants from various categories of the industry were recruited. Given jockeys themselves employ RWL, perhaps a wider sample of jockeys, particularly those with a current claim may have allowed for more nuanced understanding of their experiences with RWL and is therefore recommended for future research. A recent increase to minimum riding weight may have influenced participants' opinions on the topic through a potential recency bias. The initial briefing given to each participant provided context

for their understanding of the topics of discussion in an attempt to overcome these potential limitations. An inherent limitation to qualitative research is the potential unintentional influence of the lead researcher's ideological assumptions. Various efforts to maintain reflexivity on the part of the researcher were employed to minimise any potential unintended steering during the design and undertaking of the research, therefore the authors are confident that the findings are credible, trustworthy and thus usable for future research and practice (Sandelowski and Leeman, 2012; Smith and McGannon, 2018).

4.2 Conclusion

Rapid weight loss practices are widely accepted as a requirement of the job of being a jockey despite awareness of the harmful effects and a recognition that change is needed. Social factors, such as the influence of tradition, desire to identify as a jockey and achieve social validation from peers, desire to meet the needs of trainers, alongside lack of industry recognition of jockeys as athletes alters attitudes toward RWL and promotes it as a subjective norm among jockeys. Moreover, the low riding weights, frequency of racing and lack of access to/awareness of education and supports influence a perceived lack of behavioural control. Together, these factors influence a lack of intention to change and thus RWL continues. To address this complex phenomenon and mitigate the associated issues, a multifaceted solution potentially involving alterations to the weight structures, individual weight limits, increased education and support services is suggested, although further rationale for change is required.

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Appendix A – Interview Guide

Aim: To explore the perceptions of RWL, the riding weight and support structures and the scope for change, to ultimately devise suitable solutions.

Fixed questions:

1. What is your opinion on the methods jockeys use to make weight? (Wasting/RWL)
 - a. Do you think there are safer alternatives?
2. What is your opinion on the culture of weight-making in Irish horseracing?
 - a. What factors contribute to persistent RWL?
3. What are your thoughts on the current riding weight structures in Irish Horseracing?
 - a. Do you think minimum weight is in need of further change?
4. What are your thoughts on the support structures in place for jockeys in Irish Horseracing?
 - a. Do these suit the needs of jockeys?
5. What are your thoughts on the individualised minimum riding weight system in place for apprentice jockeys in Irish Horseracing?
 - a. Is it feasible to introduce this method for all jockeys?
6. Do you think any part of the structure requires change? If so, what?
 - a. Probe based on answer – what might change look like?
7. What would be a barrier to this change?
 - a. Probe based on answer – how strong is this barrier?
8. What would facilitate or encourage change?
 - a. Probe based on answer – What is the single strongest potential facilitator of change?

Appendix B – Individual Minimum Riding Weight System

Since 2014, all individuals applying for an apprentice jockey's licence in Ireland for the first time must obtain an individual minimum riding weight (IMRW) set by the senior medical officer following testing. The testing described in the latest rulebook involves the apprentice jockey presenting in a hydrated state ($USG \leq 1.020$), measured via urine specific gravity (USG) and body composition (skinfold assessment using the jockey specific equations detailed by (Dunne *et al.*, 2020) and body mass are assessed. Following assessment, a target minimum weight is determined for each apprentice based on a minimum body fat level of 6% for males and 12% for females. Following the establishment of the apprentice's target minimum weight, each apprentice is required to meet with the IHRB dietician to receive a full nutritional consultation to obtain an individualised meal plan and a weight-making strategy. Each apprentice must attempt to achieve their target minimum weight within six weeks from the date of the initial consultation. The rules then specify that the apprentice jockey must return six weeks after their initial consultation for retesting in a hydrated state ($USG \leq 1.020$), where skinfold testing is repeated, and body mass is taken. The rules also state that the apprentice must return for a second time in a hydrated state not less than 24 hours later to have their body mass measured again. Mean body mass for both weigh-ins is used to set the IMRW. This weight limit may be reviewed if the apprentice weighs $>11b$ overweight immediately prior to racing on two occasions.