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Tick-tock goes the biological clock: Challenges facing elite Scandinavian mother-athletes

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1 **Tick-tock goes the biological clock: Challenges facing elite Scandinavian mother-**
2 **athletes**

3
4 **Abstract**

5 Challenges facing mother-athletes (MAs) have aroused research and media attention in recent
6 years, with an increasing number of sportswomen attempting to successfully combine
7 pregnancy and motherhood with an elite athletic career. The aims of this study were to explore
8 how MA-specific challenges manifest in elite cross-country skiing in Scandinavia and to better
9 understand how female athletes balance their priorities as they initiate, maintain and/or
10 discontinue their role as a MA. Qualitative data was collected through semi-structured
11 interviews with 13 female cross-country skiers from Norway and Sweden. Thematic analyses
12 revealed four MA-specific challenges facing the athletes: 1. *Biological clock vs. peak*
13 *performance*; 2. *Maintaining fitness vs. training safely*; 3. *Receiving support vs. facing*
14 *deselection*; 4. *Balancing competing MA demands*. Many of the athletes felt pressured into
15 prioritizing either motherhood or athletic excellence, particularly in their early to mid-thirties
16 when the window of opportunity for building a family was considered limited. Further,
17 maintaining fitness and training safely during pregnancy was perceived as a challenge, as was
18 balancing the MA role after childbirth. In many cases athletes felt uncertain about whether they
19 would receive support from their team or federation. Moreover, there were expectations of
20 incompatibility surrounding the MA role. More research and educational efforts to promote
21 MA-specific knowledge, as well as developing structured processes and providing policies to
22 support female athletes, are identified as vital future steps. These measures may prolong
23 athletic careers and enhance wellbeing for elite female athletes.

24

25 **Keywords:** cross-country skiing, dual role, motherhood, postpartum, pregnancy, work-life
26 balance

27

28 **Introduction**

29 Combining pregnancy and motherhood with an elite athletic career is a relatively unexplored
30 yet important research area (McGannon et al. 2015; Palmer & Leberman, 2009; Tekavc et al.,
31 2020). Previous studies have shown that many elite female athletes are able to attain a similar
32 or higher performance level after childbirth compared to pre-pregnancy (Darroch et al., 2022;
33 Forstmann et al., 2022; Sundgot-Borgen et al., 2019). Similarly, sustaining a multidimensional
34 life and identity has been shown to help some athletes achieve excellence in sport and promote
35 long-term athletic development (Carless & Douglas, 2013). Studies have also proposed that the
36 combination of elite sport and motherhood can, with the right support network, generate a
37 greater sense of wellbeing, resilience, patience, perceived autonomy and training motivation
38 (Appleby & Fischer, 2009; Tekavc et al., 2020). Nevertheless, initiating and maintaining a
39 mother-athlete (MA) role is associated with several challenges (Davenport et al., 2022; Dietz
40 et al., 2022; Tekavc et al., 2020).

41 Pregnancy and childbirth directly disrupt training and racing possibilities for female
42 athletes (Solli & Sandbakk, 2018; Sundgot-Borgen et al., 2019). In world-class marathon
43 runners, for example, maternity breaks were reported to last between 9 months and ~ 8 years
44 (Forstmann et al., 2022). As such, initiating and maintaining a MA role may have negative
45 effects on a woman's athletic career. For example, previous research has reported effects on
46 performance rankings (Hellborg 2019), mental health (Appleby & Fischer, 2009), physical
47 fitness (Forstmann et al., 2022) and financial support from stakeholders (Dietz et al., 2022).
48 Many MAs also feel pressured into fulfilling the social and cultural stereotypes associated with
49 being a good mother, such as being present and always prioritizing the child's needs before

50 their own (Appleby & Fisher, 2009), while at the same time managing professional demands
51 as an athlete. If assistance from support networks is insufficient there is a risk that MAs will
52 experience anxiety, self-doubt and/or feelings of failure (Kavoura & Ryba, 2020). Due to these
53 potentially negative consequences, initiating a MA role is met by many female athletes with
54 ambivalent feelings (Hellborg, 2019; Tekavc et al., 2020; Jackson et al., 2021).

55 With competing mother versus athlete demands MAs may sense an inner conflict
56 (McGannon et al., 2018; Davenport et al., 2022). Media representation of the MA role as a
57 polarized construct with incompatible demands, otherwise portraying the MA as a *superwoman*
58 (McGannon et al., 2015), contributes further to this perceived dichotomy and withdrawal from
59 sport is a potential consequence (Eliasson & Johansson, 2021). Indeed, female athletes are
60 more likely than their male counterparts to terminate their athletic careers when **having children**
61 (McGannon et al., 2015; Moesch et al., 2012). **Furthermore**, Stråhlman (2006) reported that
62 only 12% of elite female athletes in Sweden continued their sporting career as parents,
63 compared to 50% of elite male athletes. Another study including over 500 Norwegian elite
64 female athletes from various sports showed that the proportion of MAs was only 4% (Bø &
65 Backe-Hansen, 2007). Athletes' priorities, decisions and values are affected by social norms,
66 politics, stakeholders, peers **and their families** (Henriksen et al., 2010; 2020). This may lead to
67 a reproduction of female stereotypes **and cultural expectations** (e.g., **that the true calling of**
68 **women is to have children and take care of them**) and increase the likelihood of women
69 **withdrawing from elite sport** (McGannon et al., 2015; 2018).

70 Challenging cultural norms by initiating and maintaining a MA role may come with
71 social costs. For example, women in Sweden are encouraged to obtain educational
72 qualifications, secure a good job and start a family (Ekengren et al., 2021). Elite athletes may
73 be excluded or ostracized because of perceived deviations from these cultural expectations
74 (e.g., **by combining motherhood and an athletic career**), thereby risking deselection or reduced

75 career-development opportunities (Hellborg, 2019). This may lead some athletes to postpone
76 having children (Hellborg, 2019). However, postponing pregnancy until after the age of 35
77 years significantly increases the risk of miscarriage or chromosomal abnormalities in the foetus
78 (Bø et al., 2016). To date, sports organizations have rarely supported the combination of both
79 mother and athlete roles, hence elite female athletes have been forced to make difficult career
80 decisions (Davenport et al., 2022). To encourage and support continuation in elite sport during
81 this specific transition into parenthood, it is essential to develop an understanding of female
82 athletes' perceived MA-related challenges. Further, finding ways to navigate these challenges
83 is crucial in promoting longer athletic careers and wellbeing among female athletes.

84 Norway and Sweden, as Scandinavian neighbors, are culturally similar in many ways.
85 They have a tradition of emphasizing social and gender equality, providing generous parental
86 leave opportunities and public care services for children and the elderly, and boasting a
87 relatively high political representation of women (Borchhorst & Sinn 2008). Further, cross-
88 country skiing is a highly popular sport in these two Nordic countries. A case study of the
89 world's most decorated winter Olympian to date, an elite Norwegian cross-country skier and
90 mother, demonstrates that an athletic career can be successfully combined with motherhood
91 (Solli & Sandbakk, 2018). However, the perceptions and personal experiences of motherhood
92 (including the initial decision-making process, pregnancy and caring for a newborn child) have
93 not been investigated in a group of elite Scandinavian cross-country skiers. Therefore, the aims
94 of the present study were to explore how MA challenges manifest in elite cross-country skiing
95 in Scandinavia and to better understand how female athletes balance their priorities as they
96 initiate, maintain and/or discontinue their role as a MA. The practical objective of the study
97 was to provide new information that could help facilitate the prolongation of elite women's
98 athletic careers under healthy and sustainable conditions.

99

100 **Methods**

101 *Participants*

102 Three categories of elite female cross-country skiers were recruited to this study: 1) pre-
103 childbirth with a wish to become a mother in the future; 2) active MAs; 3) former MAs who
104 had since ended their athletic careers. ‘Elite’ was defined as competing for a national or
105 professional team at senior level. Purposive sampling was used to identify suitable informants.
106 After drafting a list of prospective Norwegian and Swedish elite female cross-country skiers
107 with characteristics matching the inclusion criteria, 15 athletes were invited to participate in
108 the study via private telephone or email. Before providing consent to participate, the informants
109 confirmed that they matched one of the three categories for inclusion (i.e., having a wish to
110 have, or already having had at least one child). In total 13 athletes accepted and fulfilled the
111 study requirements (Table 1).

112 ***TABLE 1 ABOUT HERE***

113 *Data collection and analysis*

114 Data was collected through semi-structured interviews lasting 24–51 minutes ($M = 35.9$;
115 $SD = 9.8$). Since the informants were based in various locations in Norway and Sweden, the
116 interviews were conducted using online video conference software (Zoom Video
117 Communications, Inc., San Jose, California, USA). The benefits of this method have been
118 outlined by Archibald et al. (2019). The interview guide included questions relating to the
119 informant’s athletic background, life situation (e.g., family and financing) and preconceptions,
120 experiences and perceived challenges relating to the MA role. Further, in line with Gratton and
121 Jones (2004) and Patton (2002), the interviewer (i.e., the first author) used open questions or
122 probes. For example, some of the questions from the interview guide were: a) *In what way*
123 *did/do you expect having a baby affect/will affect your athletic career?* b) *What do/did you find*
124 *difficult with being/becoming a MA?* c) *What would/do/did you need to make the MA role*

125 *work?* The first language of the interviewer was Swedish, two co-authors had Norwegian as a
126 first language, one co-author had English as a first language and all authors had a good working
127 knowledge of all three languages. Depending on the first language of the informant, the
128 interviews were conducted in either Swedish or Norwegian. All interviews were recorded and
129 transcribed. To avoid any potential misunderstandings when translating selected quotes to
130 English, the co-author with English as a first language also agreed on the translations of the
131 selected quotes.

132 The interview data was analyzed according to the six steps of Braun and Clarke's (2006)
133 thematic analysis: 1) familiarizing yourself with the data, 2) generating initial codes, 3)
134 searching for themes, 4) reviewing themes, 5) defining and naming themes, and 6) producing
135 the report. After transcribing the interviews, the first author worked through steps 1–5. The
136 transcripts were read with an open mind to get an overview of the content. Here, interesting
137 features from the entire dataset were roughly categorized (step 2). In the third step of the
138 analysis, initial clusters of themes were identified and labelled. After discussing various
139 perspectives and interpretations of the themes with the co-authors to ensure peer validity, the
140 themes were reviewed (step 4), refined and re-labelled (step 5). In the final step, representative
141 quotes that reflected the themes and the study aim were selected and presented in the report
142 (step 6).

143 ***Ethics statement***

144 The prospective informants were presented with the study objectives and assured that
145 participation was voluntary and that they could withdraw at any time during the process until
146 the findings were published. Before conducting the interviews, the informants gave their
147 informed consent after receiving a letter with all necessary information (e.g., interview topics,
148 procedures and confidentiality). After the interviews each informant received a copy of their
149 transcript and were given an opportunity to add, remove or correct the data. To ensure that the

150 informants could not be identified from the selected citations in the written report they were
151 assigned pseudonyms. Only the co-authors of this paper had access to the collected data and
152 sensitive information about the informants. This study was carried out according to the
153 Declaration of Helsinki (WMA, 2021) and approved by the national ethical committees in
154 Norway (NSD) and Sweden (reference 2022-00335-01).

155

156 **Results**

157 Thematic analyses revealed four main MA-specific **challenges** facing the athletes when
158 considering motherhood (Figure 1). The first **challenge**, *Biological clock vs. peak performance*,
159 reflects the coincident age range where athletes feel they need to become pregnant at the same
160 time as reaching peak performance. The second **challenge**, *Maintaining fitness vs. training*
161 *safely*, reflects the informants' concerns about how their bodies and fetuses may be affected
162 during and after pregnancy. The third **challenge**, *Receiving support vs. facing deselection*,
163 highlights concerns among athletes about maternity provisions from their professional team,
164 sports federation, sponsors, etc. The fourth **challenge**, *Balancing competing MA demands*,
165 relates to MAs wanting to perform at the highest level in their sport relatively soon after giving
166 birth, while also being the best mother they can be.

167

FIGURE 1 ABOUT HERE

168 ***Challenge 1: Biological clock vs. peak performance***

169 For **the** informants without children their biological clock (i.e., age) was a stress factor, causing
170 concern about how many more years they could wait before starting a family. **Four of the six**
171 **pre-childbirth informants** were approaching their mid-thirties, which they perceived to be a
172 critical time to start a family and avoid pregnancy-related complications, especially if they
173 wanted to have more than one child. At the same time, some were performing better than ever
174 in their sport and were close to achieving their main goals. Sara, **like two of the other pre-**

175 **childbirth informants**, perceived her peak performance to coincide with her desire to **have**
 176 **children**:

177 *I now feel like I'm starting to perform well. Now I want to continue [with elite sport],*
 178 *but I also want to have a family and that has to happen quite soon [...]. Suddenly*
 179 *you're in a situation where you have to hurry up a bit [...]. It's not like I can wait until*
 180 *I'm 40 to have children, so a time is coming pretty soon where I have to make a*
 181 *decision about it.*

182
 183 The potential effects on their bodies during pregnancy and postpartum worried the informants,
 184 with many believing that their future athletic careers would be compromised. The uncertainty
 185 about the possible negative consequences of pregnancy and childbirth, in combination with
 186 excellent results after many years of training, led to Maren wanting to postpone her
 187 commitment to **having a child** for as long as possible:

188 *Right now I'm not there mentally to reduce my elite performance level... Should I take*
 189 *that risk [of being unable to return to the same level of performance], compared with*
 190 *continuing for a couple more years and then seeing what happens and what will be*
 191 *will be?*

192
 193 Some of the **pre-childbirth** informants were positive about combining the MA roles (i.e., Anne,
 194 Maren and Sara), while others felt that pregnancy would be a separate chapter in their lives
 195 (i.e., Siri, Johanna and Heidi). Johanna felt that having children and continuing with her **athletic**
 196 career were incompatible **pursuits** and she was prepared to retire from competitive sport when
 197 it was time to start a family:

198 *For me personally, I think I'm quite clear about how I would like to do things. That*
 199 *is, I'll do it [have children] after [my sporting career]. That might mean I end my*
 200 *[sporting] career a bit **early**.*

201
 202 The MAs and former MAs reported similar experiences during their **pre-motherhood**
 203 phases as the informants without children. They typically expected their performance to be
 204 reduced for at least a year around childbirth and the prospect of a return to elite sport was
 205 uncertain, so how they considered and negotiated their priorities often depended on what stage
 206 of their career they were or had been in (i.e., how satisfied they were with their athletic

207 achievements). Being content with their athletic careers and having achieved their main goals
 208 seemed to make them more prepared to take a risk, as expressed by Lise:

209 *If that would be the case [being unable to return to sport], then it's more important to*
 210 *me to have a family than skiing, even if my plan was to come back [...]. I was always*
 211 *aware that I wouldn't be bitter, I've already had a [successful] career.*

212
 213 Ingrid expressed a similar attitude, perhaps due to having achieved many of her sporting
 214 ambitions, which included winning national and international championship medals. Ingrid had
 215 thought about having children some years earlier, but at that point in her career her priorities
 216 were more similar to Maren's:

217 *I think if I would have had children then [earlier], it would probably have worked out*
 218 *fine [...]. [But] I was skiing well and I felt like doing that for some more years and to*
 219 *fully focus on that, really. I felt that I still had plenty of time to have children and [I*
 220 *could] postpone it [having children] for a few more years. I just wanted to compete*
 221 *at my best for a couple more years back then.*

222
 223 Despite expectations to the contrary, **five of the seven** MAs and former MAs produced their
 224 best career results (e.g., winning international titles or medals) after having children. Mikaela
 225 gave an extremely positive account of her pregnancy in relation to her athletic career:

226 *I competed until more than five months into my pregnancy. That was my last race. I*
 227 *came top 10 at a national race when I was four months pregnant. Everything went*
 228 *extremely well during the whole pregnancy really [...]. I don't think that I would have*
 229 *been able to come back so quickly if I hadn't trained so much during the pregnancy*
 230 *[...]. I won a national race [the year after]. That was less than half a year after I gave*
 231 *birth.*

232
 233 Other athletes planned specifically for pregnancy according to their career goals, as highlighted
 234 by Lise:

235 *I raced in the Olympics and then it was the World Championships the year after [...].*
 236 *I raced at the World Championships and then I got pregnant right after that, so it was*
 237 *really planned and we were also lucky that it [getting pregnant] happened straight*
 238 *away.*

239
 240 For Tora, returning after pregnancy was more of a struggle:

241 *I thought it was going to be easier, physiologically [...]. I wasn't at the same physical*
 242 *level as before [pregnancy] at all and it took some time [to recover] [...]. I don't even*
 243 *know if I have come back to the same level of strength [now] as before.*

244

245 These experiences indicate that the impact of pregnancy and childbirth is individual and
 246 difficult to predict, which creates a perception of ‘playing roulette’ among elite female athletes
 247 who are considering **motherhood**.

248 **Challenge 2: Maintaining fitness vs. training safely**

249 To minimize the decline in performance during and after pregnancy, those informants who
 250 decided to initiate the role as a MA attempted to maintain training volume as much as possible.

251 This led to the emergence of a **challenge** related to safety, as expressed by Ulrika:

252 *Sometimes you get a bit worried [...]. I wanted to train as much as my body allowed*
 253 *and even do intervals and stuff, but you're also really afraid that you'll do something*
 254 *that isn't good for the baby [...]. You don't really dare to go all-out.*

255
 256 Feeling secure during pregnancy (e.g., being supported by experts and having sufficient
 257 knowledge about safety) seemed to be a key element for optimizing training, reducing
 258 pregnancy-related worries when training and increasing the chance of a successful comeback.
 259 However, the MAs and former MAs found it difficult to know how they should adapt their
 260 training or search for relevant information **about training throughout pregnancy. Three of the**
 261 **MAs and former MAs had contacted health care services (e.g., a physiotherapist or**
 262 **gynecologist) to try to get answers to their pregnancy-related questions. However, they**
 263 **perceived** that general healthcare professionals did not understand the demands of elite sports.
 264 Some informants also felt that their coaches did not have enough knowledge about training
 265 through pregnancy. Therefore, many felt lost and on their own, as described by Lise:

266 *I took care of my own training and often exercised according to feel, but then I tried*
 267 *to ask those [athletes] who had children already [...]: “What is ok?” and “What isn't*
 268 *ok to do?” It's difficult to find much information.*

269
 270 **For three of the MAs and former MAs, asking other MAs for advice had been one of their main**
 271 **sources of information about training while pregnant. However, these discussions were often**
 272 **impromptu.** Only two former MAs received specific assistance through their professional team

273 or sports federation to help optimize their training during pregnancy and postpartum. Ingrid
 274 recalls getting help from a female doctor with an understanding of sport:

275 *The female doctor I had had three children and had been sporty herself, so she made*
 276 *me feel secure and I got good check-ups with extra ultrasounds, more often than*
 277 *normal, to check that everything was going well [...]. I got to meet other pregnant*
 278 *athletes, as well as others who had given birth. I asked a lot and got many answers*
 279 *there.*

280
 281 Ingrid had initially been assigned a male doctor, whom she perceived had limited knowledge
 282 of the combination of pregnancy and elite sport. This led her to seek out alternative options and
 283 eventually find the female doctor described here. These findings indicate that available support
 284 and resources vary considerably. Moreover, expectant MAs and those around them appear to
 285 lack sufficient knowledge about how best to train through pregnancy and postpartum.

286 **Challenge 3: Receiving support vs. facing deselection**

287 **None** of the informants knew how their support networks would react if they became pregnant.
 288 In contrast to injuries or doping issues, pregnancy was not mentioned in their contracts or
 289 discussed by stakeholders in general. Anne ‘hoped’ that she would be supported if she were to
 290 **have a child**, but she did not know for certain:

291 *I would hope that it [the contract] wouldn't be affected if I want to continue [with elite*
 292 *sport] after [pregnancy], and I hope that the sponsors I have would want to support*
 293 *me regardless of the decisions I make in my private life, even if they affect my sporting*
 294 *life.*

295
 296 Many of the athletes feared that they might lose their sponsors, wages, or place on their team,
 297 but they had almost never discussed the consequences of pregnancy proactively within their
 298 support networks. Mikaela, who had experienced an unexpected pregnancy, was also worried
 299 that her **athletic** career could be over:

300 *I was really nervous. I called them [the coaches] and said I wanted a meeting [...]. I*
 301 *don't know if they had suspected what it was about [...], but they seemed almost*
 302 *prepared for it because they were like: "That's no problem". [...]. They said: "We've*
 303 *had one [athlete] before who was a mother, so this is fine. You can join the training*
 304 *camps and anything you want during the whole pregnancy. You'll keep your salary.*
 305 *We always have a doctor at the camps, so you can do what feels right" [...]. I've told*

306 *them [my coaches] many times since that the way they handled the situation was the*
 307 *reason I continued [in the sport].*

308
 309 Mikaela was positively surprised by her coaches' reactions and recalls the meeting as a crucial
 310 moment in her career. She was unaware of her team's MA policy before she became pregnant,
 311 or if one even existed. Fortunately for Mikaela, her coaches encouraged and supported her. But
 312 this was not the case for **three** other informants, including Petra:

313 *It's not said in advance, so it's not agreed that: "If you have a baby, you will lose*
 314 *your place [on the team]". But it was more like, after I had a baby, there wasn't a*
 315 *place [on the team] anymore [...]. [But I] didn't have any [good] results to show, so*
 316 *you don't feel like you can ask for much either.*

317
 318 With no explicit guidelines in place for Petra, she felt powerless. However, she believed that
 319 she would have received more support if her pre-pregnancy results had been better. Eventually,
 320 Petra found another professional team and continued as a MA. Similarly, Emma became
 321 pregnant not long after signing with a team and, despite having good results, subsequently lost
 322 her place on the team. Ulrika had a slightly different experience with the same team. Although
 323 she didn't receive any support during her first pregnancy, the team seemed more willing to help
 324 during her second pregnancy (**i.e.**, after successfully returning to elite sport once, **when** her
 325 team and coaches realized what **she was capable of**):

326 *In one way I didn't feel much pressure because nobody believed that I would be able*
 327 *to come back [...]. But I was certain that I wanted to return [to elite sport]. There was*
 328 *no doubt from my side [...]. It also feels like you have to be performing at a very high*
 329 *level to get any help [...]. The second time maybe there was a stronger belief that I*
 330 *would be able to come back... or that was totally clear. So then I was actually allowed*
 331 *to join training camps with the A-team [during and after the pregnancy] [...] so there*
 332 *was a clear difference.*

333
 334 The potential risk of losing all support made the informants without children uncertain about
 335 initiating the role as a MA, as expressed by Sara:

336 *If I had been told by the team: "Ok, now you will be away for one year, but you can*
 337 *come back and get this sort of help along the way", then it would be much easier to*
 338 *become pregnant without the uncertainty.*

339

340 Economic aspects of maternity were perceived as one of the main concerns among all
341 three informant sub-groups. Emma received limited financial remuneration as an athlete and
342 was forced to balance motherhood with training and additional work, which eventually became
343 unsustainable and led to her discontinuation as an elite skier. Some of the athletes in the pre-
344 childbirth group hesitated to initiate the MA role because they felt their athletic careers did not
345 generate enough income to be able to provide for a family. For example, Siri was unable to live
346 fully off her sporting income (i.e., wages and prize money), so she worked an additional part-
347 time job. The risk of adding the further stress of a baby to the total load of work and elite sport
348 was one of Siri's arguments to postpone family life, as she felt the challenge would be
349 insurmountable:

350 *Now I'm unable to make ends meet only by skiing. I would need a part-time job and*
351 *be a skier and I'd have a child. I don't know how I would fit it all in [...]. If I could be*
352 *a full-time skier then I might think about it in another way because then at least I could*
353 *ski during my work time.*
354

355 In general, the MAs who were able to maintain their dual roles for the longest periods of time
356 had superior funding through wages, prize money and/or sponsors. They also received greater
357 social support from coaches and their professional team or sports federation, as well as having
358 support from at least one significant other (e.g., a partner, sibling or parent). Heidi did not see
359 support from family members as an option as her partner was also an elite cross-country skier
360 and their parents lived hours away. In contrast, Sara believed that her partner might be able to
361 extend his share of parental leave, work from home and possibly join her during competitions.
362 She also believed that her parents would be able to assist them, and had observed her male
363 teammates with children, which made her more optimistic about being able to balance
364 parenthood with elite sport:

365 *I've seen the guys in the team leave their children at daycare, go out on a long training*
366 *session, and then pick up their children [...]. Long-distance ski training is pretty*
367 *optimal because you've finished training by the afternoon, so you have plenty of time*
368 *to be a good parent, I think... But it's maybe the period before daycare that I'm a bit*
369 *unsure about [...].*

370
 371 Tora experienced challenges during the early period of motherhood, with a clear change after
 372 her child started daycare at 18 months. From that point Tora perceived that her athletic career
 373 became more similar to how it had been before she had a child (e.g., in relation to training and
 374 recovery time). During the first year as a MA she had relied on her father helping during his
 375 lunch breaks, which had given her two hours to train. To manage during the first year, support
 376 from partners and parents seemed to play a crucial role for the MAs.

377 **Challenge 4: Balancing competing mother-athlete (MA) demands**

378 Cross-country skiing is an individual sport that requires a high investment of time, attention
 379 and effort when training, travelling and competing, so the additional obligation of motherhood
 380 **created an inner conflict among the MAs.** Mikaela's experience highlights this emotional
 381 challenge:

382 *My child was with my parents for more or less the whole period [World*
 383 *Championships] [...]. When I came home after the World Championships they [my*
 384 *child] fell and hurt themselves and ran to my mother. They ran to their grandmother and*
 385 *not to me. I can still feel how that felt today, several years later, and that was when I*
 386 *said to myself that it's not worth it.*

387
 388 After this experience, Mikaela tried to find ways to balance her two roles more equally. She
 389 tried to take her child away with her when possible and skipped training camps at other times.
 390 Lise faced a similar inner conflict to Mikaela as she tried to balance the dual roles, **but Lise**
 391 **seemed to have come to terms with her feelings of bad conscience:**

392 *I feel like I might not be a good mother if I'm away for two weeks. But I also feel that*
 393 *when I am home I can be that mother who, when my child comes home from school,*
 394 *I'm at home every day and we often have time to do things [...]. I see a great benefit*
 395 *of the life we have, where we have time to do a lot with our child.*

396
 397 Both Mikaela and Lise describe having a bad conscience when they were away from their
 398 children for longer periods of time. This indicates a conflict between feeling responsible as a
 399 parent and wanting to be a good mother, while also trying to maintain a successful **athletic**
 400 career. While Mikaela and Lise had found different ways to balance their dual roles, most of

401 the informants without children were skeptical to becoming a MA, partly because they believed
 402 they would not be able to manage combining elite sport with parenting, as expressed by Heidi:

403 *I already know what it [elite sport] takes... double [training] sessions every day,*
 404 *somewhere you will have a baby and during the first year the baby won't be in daycare*
 405 *[...]. It's difficult, this thing, that you really might want to be able to do both for a*
 406 *while, but my attitude has always been so strong that: "then I will retire [from elite*
 407 *sport], then I will completely focus on my children". But the last year I've asked*
 408 *myself: "why have I been so stuck in this way of thinking?" and it's difficult to answer,*
 409 *but then I've also thought that: "it won't work", kind of like: "then I'll leave it".*

410
 411 Based on the narratives of the MAs and former MAs, finding ways to balance the dual roles
 412 was a process that never truly ended. Rather, the MA role changed character with the age
 413 and developing interests of the child or children. Those MAs maintaining the dual roles for
 414 the longest time seemed to have found ways to adapt (e.g., training mainly from home to
 415 minimize days away). Interestingly, five of the seven informants with a child/children
 416 (Mikaela, Ingrid, Ulrika, Petra and Lise) had produced some of their best athletic results as
 417 MAs. Petra offered the following positive remark:

418 *You get a whole different perspective and it's much easier to handle setbacks if they*
 419 *occur. It's easier to zoom out when you have a family.*

420
 421 However, some of the former MAs expressed a wish to spend more time with their families
 422 and this contributed to their decision to discontinue in elite sport, even when external support
 423 was perceived as sufficient. This was exemplified by Tora:

424 *I had the thought that: "What would it be like to experience a Christmas without*
 425 *thinking about training, racing, that I have to prepare myself [for the competition*
 426 *period]?" And when I thought about it, I was just like: "Oh, how nice that would be!".*
 427 *Also, there was a thought in the back of my mind that we wanted another child [...].*
 428 *Then I didn't feel that I had the energy or power to combine it [parenting] with sport*
 429 *[anymore].*

430

431 **Discussion**

432 The aims of the present study were to explore how MA **challenges** manifest in elite cross-
 433 country skiing in Scandinavia and to better understand how female athletes balance their
 434 priorities as they initiate, maintain and/or discontinue their role as a MA. The findings reflect

435 the underlying thought processes that influence elite athletes' choices about initiating or
436 avoiding the MA role within a specific context (i.e., cross-country skiing in Scandinavia).
437 Reasons for maintaining or discontinuing an **athletic** career as an MA were also explored.

438 **Consistent** with previous research (e.g., Stambulova et al., 2009; Wylleman et al., 2004;
439 McGannon et al., 2015; **Tekavc** et al., 2020), our findings show that parallel life transitions and
440 commitments can be challenging for athletes. Female athletes reaching their athletic peak may
441 also be of an age where they want to **have children**. Many of the athletes mentioned 35 years
442 as the upper age limit by which they felt they wanted to become pregnant, likely due to a higher
443 risk of pregnancy-related complications after the age of 35 (Bø et al., 2016). At the same time,
444 there is no guarantee that an athlete will recover to their prior performance level after
445 pregnancy, or how long recovery might take, which seemed to be strong incitements to
446 postpone childbirth for as long as possible. Hence, initiating the MA role was perceived by the
447 athletes as playing roulette with their athletic careers.

448 **For the athletes in our study**, coming to terms with the risk of a potential decline in
449 performance, or even the risk of discontinuation in sport seemed to be easier for **those** who had
450 already achieved a high level of performance. By contrast, handling this prospect was more
451 difficult for the athletes just starting to reach peak performance. **For example, two athletes** had
452 planned to have children before the age of 35, but postponed doing so because their sporting
453 careers were going so well. **One the other hand, five of the seven MAs/former MAs (~ 71%)**
454 **achieved their best career results (e.g., wining international titles or medals) after becoming a**
455 **mother**. Forstmann et al. (2022) have recently reported **similar results, with** 26 out of 37 world-
456 class MA marathon runners (~ 70%) **achieving** their personal best result after childbirth.

457 **In the present study**, the athletes' **experiences of how training should be adapted through**
458 **pregnancy** was often based on informal discussions with other MAs, rather than scientific
459 evidence. **Evidence-informed guidelines for elite endurance athletes training through**

460 pregnancy are currently lacking, but a recent study by Szumilewicz et al. (2022) has shown
461 that performing high-intensity interval training (HIIT) during pregnancy, which was one of the
462 perceived concerns that emerged in the present study, is safe in terms of obstetric outcomes
463 and maternal health. Therefore, the widespread notion that female athletes should avoid HIIT
464 during pregnancy may be unfounded. However, high-risk activities (e.g., with an increased risk
465 of falling, sustaining injuries or hypoxia) are not recommended (De Vivo et al., 2022).

466 Previous studies have shown that many elite female athletes are dissatisfied with the
467 training-related advice they receive during pregnancy (Sundgot-Borgen et al., 2019; Davenport
468 et al., 2022), which was also observed in the present study. Limited communication between
469 female athletes and their coaches about training during and after pregnancy may result from a
470 lack of subject knowledge, as has been identified in relation to other female health-related
471 topics (Höök et al., 2021). Taken together, these findings indicate a need for more research and
472 better education and information dissemination among female athletes, their coaches,
473 professional teams and sports federations in relation to training through pregnancy.

474 The informants in the present study could not predict the exact consequences for their
475 athletic careers when considering or initiating the MA role, and many believed that they had to
476 have reached a high level of performance before maternity to retain support from their
477 stakeholders. They were uncertain about how their current finances and position would be
478 affected (e.g., wages, sponsorship, place on the team, etc.) and what additional MA support
479 they would have access to (e.g., medical expertise and resources). Previous studies of team and
480 individual sports have highlighted similar concerns among female athletes relating to contracts
481 and structural constraints, as well as a fear of being viewed as undedicated to their sport if they
482 were to become a mother (Culvin & Bowes, 2021; Davenport et al. 2022). Combined, these
483 factors may make pregnancy and motherhood difficult and uncomfortable for prospective MAs
484 to discuss proactively. In the present study, none of the informants had discussed potential

485 consequences or measures within their support networks (e.g., with coaches, teams/federations
486 or sponsors).

487 **While** the responsibility is on professional teams and sports federations to proactively
488 clarify their MA policies, early and transparent communication initiated by the athlete could
489 be beneficial. Proactivity in this context has been suggested by Donnelly et al. (2021) and could
490 help to combat the low expectations regarding MA support that was exhibited by many of the
491 informants in the present study. It is likely that the relative rarity of the MA phenomenon to
492 date, combined with limited MA communication and knowledge, may leave athletes'
493 stakeholders unaware of the support their athletes need to initiate and maintain the MA role.
494 One of the informants in the present study (**Ulrika**) reported receiving more support from her
495 team after her second pregnancy, **suggesting** that greater MA-specific knowledge and
496 experience within small working elite sport groups can lead to a more positive outcome. **Fit-**
497 **for-purpose policies incorporating specialist advice and developed collaboratively by all**
498 **stakeholders are likely to help reassure prospective MAs.**

499 In addition to **the development of** formal governing body policies, representation and
500 support from other elite MAs may play an important role in promoting knowledge and
501 communication and help to optimize the MA support needed (Davenport et al., 2022). **For**
502 **example, sharing experiences may improve knowledge related to MA challenges, facilitate**
503 **stakeholder communication, and help other athletes cope with their MA concerns. Moreover,**
504 **reshaping existing notions about the effects of motherhood on athletic performance through**
505 **media or MA group discussions may help to open up the conversation about dual MA roles**
506 **(McGannon et al., 2018). For example, a greater ability to zoom out, gain perspective and**
507 **handle setbacks after becoming a parent was highlighted as a positive outcome in the present**
508 **study, which is consistent with previous findings (Tekavc et al., 2020; Carless & Douglas,**
509 **2013; Appleby & Fisher, 2009).**

510 The narratives of the MAs and former MAs in the present study revealed a range of
511 challenges associated with maintaining the MA role. The first year postpartum was perceived
512 as the most challenging, partly because the baby was more dependent on the mother but also
513 because children in Scandinavia usually start attending daycare after 18 months, meaning that
514 time available for training is more limited prior to this. Massey and Whitehead (2022)
515 suggested that female athletes may need at least six months after giving birth to adapt to the
516 new circumstances, both physically and mentally, with balancing and reshaping identities
517 highlighted as specific challenges during this time. However, findings from the present study
518 indicate that the dual-role 'mother versus athlete' conflict, which persisted to varying degrees
519 after six months among the MAs and former MAs, may never disappear completely. Rather,
520 the different phases of the child's development (e.g., the infant years versus school age) created
521 different challenges for the MAs. Future studies could investigate how these challenges
522 manifest for elite male athletes, in terms of a 'father versus athlete' conflict.

523 Previous research indicates that female athletes are more likely to have multiple identities
524 than their male peers (Ekengren et al., 2021; McGannon et al., 2018). Moreover, Scandinavian
525 women in high-commitment careers (e.g., politics and academia) struggle to balance work,
526 family, friends and hobbies more than men in similar professions (Seierstad & Kirton, 2015;
527 Grönlund, 2020). Therefore, trying to blend different contexts and roles, such as becoming a
528 MA, can be a difficult equation to solve (Eriksen, 2021). While some elite female athletes
529 continue to strive for excellence and making a living from their sport as a mother, others may
530 disengage from sport. Our findings showed that the incompatibility of roles was perceived as
531 one of the main concerns among the informants without children. Consistent with previous
532 studies (Davenport et al., 2022; Appleby & Fisher, 2009; McGannon et al., 2018), the MAs in
533 the present study struggled to balance their dual roles and they experienced feelings of bad
534 conscience by not focusing solely on parenthood. It could be that the dual-role conflict was

535 enhanced by the informants' high expectations of themselves (i.e., being a world-class athlete
536 and the best mother possible). Even if some of the informants wanted to continue with elite
537 sport, have a family and prepare for a future career, combining all three seemed insuperable.
538 One informant (**Emma**) pursued this combination when she lost her support networks, **which**
539 eventually led to her discontinuation as an elite athlete.

540 The MAs who maintained dual roles for the longest time in the present study seemed to
541 have found **ways to cope** with the **challenges**. For example, one informant reported timing her
542 **pregnancy around major championships (Ingrid)**, while others tried to minimize the time away
543 **from home (Lise)**. Additionally, many of these MAs had been able to retain financial and social
544 support from their employers and family, respectively. Interestingly, and consistent with
545 findings reported by Hellborg (2019) and Davenport et al. (2022), many of the informants
546 believed that this support was important for their decision to extend their athletic careers and
547 at least indirectly enabled them to reach peak performance. By contrast, reduced financial and
548 social support during pregnancy and postpartum seemed to increase the risk for sport
549 discontinuation. **The** greater impact and burden on female athletes when choosing to become a
550 parent, compared with their male counterparts, requires further consideration from research,
551 practical and policy-making perspectives.

552

553 **Conclusions**

554 In this study we explored how MA **challenges** manifest in cross-country skiing in Scandinavia,
555 with a view to better understand how elite female athletes balance their priorities as they
556 initiate, maintain and/or discontinue their role as a MA. We identified four main **challenges**
557 facing our informants: 1. *Biological clock vs. peak performance*; 2. *Maintaining fitness vs.*
558 *training safely*; 3. *Receiving support vs. facing deselection*; 4. *Balancing competing MA*
559 *demands*. In many cases these **challenges** were caused by a lack of knowledge, communication

560 and practical support. There were also perceptions of incompatibility regarding the dual MA
561 roles. While discontinuing an athletic career in conjunction with **having children** might be the
562 right decision for some, there is a risk that the reproduction of female stereotypes (**e.g., that the**
563 **true calling of women is to have children and take care of them**) may increase the likelihood of
564 women withdrawing from elite sport (McGannon et al., 2015; Eriksen, 2021; Persson et al.,
565 2020). To overcome this potential problem, research studies have suggested that stakeholders
566 (**e.g., athletes, coaches, teams, and federations**) should develop clear MA policies that value
567 and support continued participation in sport during and after pregnancy (Davenport et al., 2022;
568 Donnelly et al., 2021). Frameworks have recently been developed in the UK highlighting the
569 importance of mutual communication between athletes and stakeholders from an early stage of
570 pregnancy to support a successful return to sport (UK Sport, 2021) and consultation with
571 multidisciplinary teams to develop individualized timescales for postpartum recovery
572 (Donnelly et al., 2021). More research and educational efforts to promote MA-specific
573 knowledge, as well as developing structured processes and policies to support female athletes,
574 are vital future steps. These interventions may promote longer athletic careers and enhance
575 wellbeing among elite female athletes.

576

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580

581 **Declaration of interest**

582 The authors report there are no competing interests to declare.

583

584 **Data availability statement**

585 Due to the sensitive nature of this research, participants of this study did not agree for their data
586 to be shared publicly, so supporting data is not available.

587

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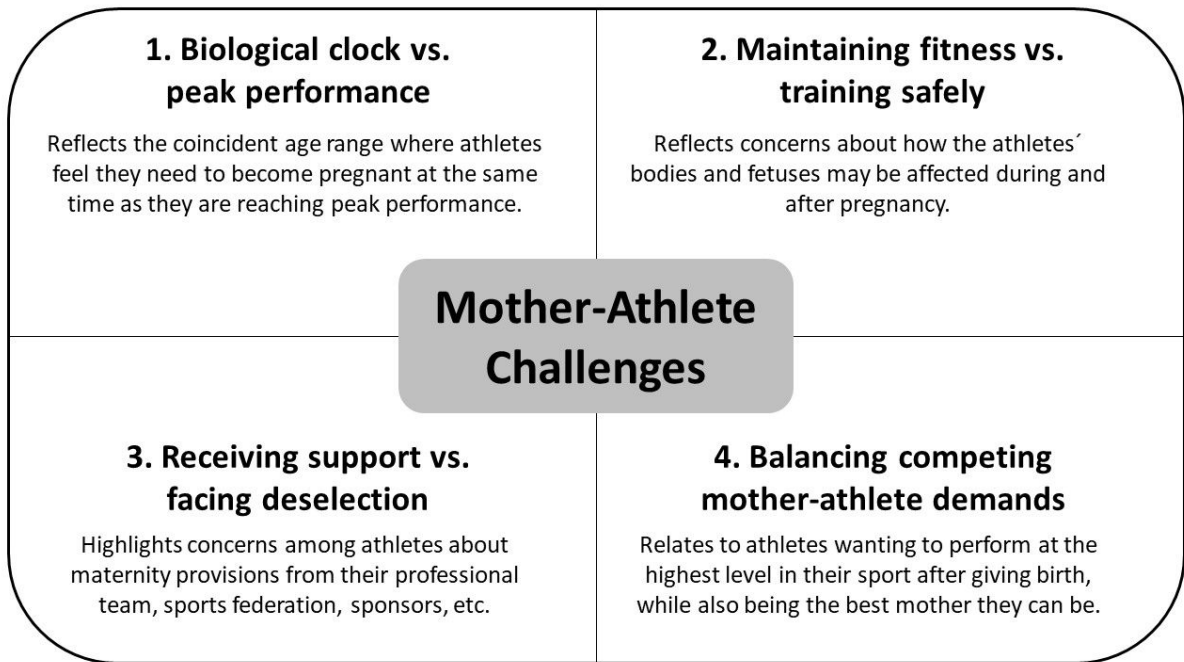
For Peer Review

726 **Table 1:** A descriptive overview of the informants

| Pseudonym | Age (y) | Category | Mother |
|------------------|----------------|-----------------------|---------------|
| Anne | 25–30 | Pre-childbirth | No |
| Siri | 25–30 | Pre-childbirth | No |
| Maren | 30–35 | Pre-childbirth | No |
| Sara | 30–35 | Pre-childbirth | No |
| Johanna | 30–35 | Pre-childbirth | No |
| Heidi | 30–35 | Pre-childbirth | No |
| Petra | 30–35 | Mother-athlete | Yes |
| Lise | 35–40 | Mother-athlete | Yes |
| Ingrid | 40–45 | Mother-athlete | Yes |
| Tora | 30–35 | Former mother-athlete | Yes |
| Ulrika | 35–40 | Former mother-athlete | Yes |
| Emma | 35–40 | Former mother-athlete | Yes |
| Mikaela | 50–55 | Former mother-athlete | Yes |

727

728 **Figure 1:** A summary of the four main mother-athlete **challenges** identified by the female
729 athletes



730

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