General comments

This manuscript is a narrative review to conduct comprehensive survey on athletes' cognition, nutrition, and energy deficiency, along with using deep learning models. This is a very interesting manuscript, but there are some critical points in some sections that need to be improved.

Specific comments

Please, consider the following point-by-point revisions:

Title and abstract

- **Title:** The title looks confusing and long. Please simplify this part '... exploring the effectiveness of cognition, nutrition, athlete energy deficiencies and deep learning models'. Please simplify this part more objectively '... exploring the effectiveness of cognition, nutrition, athlete energy deficiencies and deep learning models'.

- **Abstract:** The background should be exploratory and objective. This information should be reported by the results Long Short-Term Memory (LSTM), Bidirectional LSTM networks, Gated Recurrent Unit Networks (GRU) and attention + LSTM to quantify the health and performance of the athletes by recognition, classification, prediction of action in their sports. All the sections of the abstract seem too long, I advise you to summarize the information.

- **Introduction:** The introduction is well structured, but the context of the analysis needs to be described in detail. In the first paragraph, the authors should focus on specific sports, because it's not clear whether the focus is on performance (exercise), or physical activity (and concerns about well-being and quality of life) **(lines 82 to 92)**. Also, the assumptions about neurogenesis and angiogenesis, as well as neurotrophins, lack context. At what stage of training and competition are the assumptions raised? **(lines 94 to 117).** Finally, the review focuses on cognition, nutrition and energy deficiencies, but I have some difficulty as to what the authors actually intend to study and review in each subdomain **(lines 120 to 158)**.

- **Methodology:** The survey methodology did not respect a set of methodological concerns when drawing up the research strategy. Please, clarify taking into account available guidelines (see: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8481359/) or previous published revisions (https://www.mjssm.me/?sekcija=article&artid=269). The criteria for evaluating the quality of the studies to include the articles, the inclusion and exclusion criteria, the data extraction strategies. Even in the case of a survey review, all of this must be explained.

- **Results:** The extraction of information for table 1 is somewhat poor and is limited to the structure of the articles. Please expand a little more, taking into account the three main axes you want to study: cognition, nutrition and energy deficiencies. The studies presented in table 1 do not describe what they report and, in fact, I find it difficult to understand their relationship with the objective set for the article.

- **Discussion and conclusions:** The discussion must be expanded. At the end, it should be clear to the reader what the literature criticizes, practical applications and future prospects. As well, the conclusions should be a short, objective section of 2/3 sentences with the main outcomes. Therefore, I recommend that you summarise the discussion in order to better frame the assumptions made with practical applicability (in what sporting context is all this useful to me?) and how I can actually understand the different dimensions of analysis that are aimed at understanding Relative Energy Deficiency in Sports (RED-S) by exploring the efficacy of cognition, nutrition, energy deficiencies of athletes and deep learning models. Also, the authors give little description of the deep models that can be applied in this context of analysis.

- **References**: Please expand a little more on the methodological procedures of the survey review.