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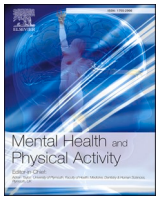

# Identification of relevant mental health indicators for European community-based health enhancing physical activity initiatives: An adapted Delphi study

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A B S T R A C T

Health enhancing physical activity (HEPA) initiatives can improve mental health; however there is a lack of standardised measures to evaluate mental health impact. This study aimed to identify the relevant indicators of mental health and well-being in community-based HEPA initiatives in Europe as determined by specialists and practitioners in the field, and understand assessment methods commonly used.

An adapted, two round, Delphi method was conducted with N = 20 specialists (practitioners and academics) in the field of mental health and physical activity from Denmark, the Netherlands, the UK, and Ireland. Specialists selected the most important indicators and agreed consensus on definitions and operationalisation, where consensus ≥50% signified important indicators.

Specialists compiled 66 (n = 21 outcome, n = 45 determinant) indicators. Top rated indicators for the evaluation of HEPA initiatives were self-rated mental health (69.2%), physical activity (69.2%) life satisfaction (53.8%), stress (53.8%), loneliness (53.8%), social participation, network, connection and support (53.8%). Consensus on definition and application of the nine indicators varied (44.4%–100%), with no consensus on a standardised measurement tool reached, although specialists pointed to the need for culturally sensitive measurement tools.

While this study highlights a lack of conformity for evaluating mental health and wellbeing outcomes, it suggests utility in an agreed definition and application of nine indicators for the evaluation of HEPA initiatives, with social determinants of particularly high importance across the relevant contexts. Further research is recommended to develop guidance on pragmatic measurement tools that can be utilised across other (European) countries and their implementation tested.

## 1. Introduction

Common mental health problems, such as anxiety and depression, have increased exponentially over the last three decades (Yang et al., 2021). Such problems make a considerable contribution to the global burden of disease, and thus, multi-faceted approaches are needed to address the impact of poor mental health at individual and population levels (Santomauro et al., 2021). The potential of Health Enhancing Physical Activity Initiatives (HEPA), which refer to a variety of programmes and interventions aimed at promoting physical activity for health benefits including mental health has been widely documented (Bird et al., 2019; Dale et al., 2019; Friedrich & Mason, 2018; Hargreaves & Pringle, 2019). Community-based HEPA in particular has the potential to improve mental health through the moderation of multiple determinants including physiological benefits but also extending to psychosocial-related improvements e.g.; sense of belonging, social support and connectedness and enhanced self-efficacy (McGrath et al., 2022; Tweed et al., 2021).

While offering mental health and wellbeing benefits, community-based HEPA can foster safe and accessible environments, with the potential to appeal to subpopulations across multiple socio-demographic backgrounds, including those who face systemic barriers in engaging with traditional health services and those in socially disadvantaged groups, who are at risk of poor mental health (McGrath et al., 2022; Van der Veken et al., 2020). These initiatives may enhance the mental wellbeing among marginalised populations through moderating factors such as social inclusion and meaningful participation (Adamakis, 2022). Indeed, HEPA initiatives through sport have demonstrated efficacy in improving mental health and combatting social exclusion, reflecting their growing community proliferation (Whiting et al., 2021), and a growing appreciation of the importance of evaluation to inform evidence-based practice and to justify policy and programme development (Fynn et al., 2020). Therefore, it is important that the mental health outcomes of community-based HEPA initiatives are monitored in

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order to understand and demonstrate value through improved mental health states, and further, to grow implementation efforts and sustainability, particularly among socially disadvantaged groups (Till et al., 2021).

The complexity and heterogeneity of many HEPA initiatives creates barriers to understanding their effectiveness and generalisability (Fynn et al., 2020). This can pose challenges for practitioners who require pragmatic solutions to evaluate HEPA efforts under time and capacity constraints (Murphy et al., 2023). Indeed, the plethora of evaluation methods used within existing community-based HEPA initiatives can create further complexity within real-world contexts (Cooper et al., 2021; Emmonds et al., 2019). It is critical that HEPA interventions and practitioners who implement HEPA are supported to capture the mental health benefits (Cooper et al., 2021; Harris, 2018). Research has called for the use of standardised evaluation tools to capture outcomes that allow for comparison of data across multiple interventions and populations, offering consistent and reliable approaches to promote knowledge exchange and strengthen the evidence base (Kosowan et al., 2022). Notwithstanding effectiveness or impact, evaluations are critical to ensure that HEPA initiatives are inclusive in their approach and reach their target group (Bauman & Nutbeam, 2014; McGrath et al., 2023; Nutbeam & Bauman, 2006).

A recent review of review studies focused on physical activity evaluations across all populations has highlighted a distinct lack of consistent terminology in approaches, with an over reliance on process indicators which are the inputs of a programme, over outcome indicators, which are the programme effects (Kosowan et al., 2022). Similarly, Friedrich and Mason (2018) have emphasised a need for clearly articulated and operational definitions of wellbeing to inform evaluation beyond success or fail judgements, towards a more nuanced understanding of impact on multiple dimensions of wellbeing in populations at risk of poor mental health. Indeed, mental health is multi-dimensional and multiple measures are needed to assess outcomes accurately (Alvidrez & Barksdale, 2022).

Many evaluations to date have overly focused on physical activity related outcomes, with only 36.1% of over 8000 physical activity programme evaluations included within recent review research showing a consideration of psychological and mental health outcomes (Kosowan et al., 2022). While physical activity interventions can vary widely, identifying the most important indicators of mental wellbeing in physical activity initiatives is an important facilitator for practitioners to evaluate the mental health outcomes of their HEPA endeavours (Kosowan et al., 2022; Peitz et al., 2021). In this context, indicators represent measurable variables or constructs that serve as proxies for mental health and well-being outcomes. These indicators may encompass a range of dimensions, including risk factors, facilitators, barriers, variables, and outcomes related to mental health and well-being. In so doing, such indicators are likely to reflect multi-level factors of influence on behaviour such as within an ecological of health behaviour (Golden & Earp, 2012). Standardising evaluation approaches may overcome barriers in relation to comparability and the uptake of evidence-based programmes (Cavill et al., 2012). However, providers need pragmatic solutions to overcome resource and capacity constraints and addressing these challenges is important to demonstrate the impact of mental health promotion from HEPA in the European context. Therefore, the aim of this research was to examine if there is consensus on what indicators should be evaluated when assessing mental health in community based HEPA from the perspective of practitioner and academic specialists who focus on marginalised groups at risk of poor mental health. To address this, this research sought a range of views from diverse backgrounds from HEPA via an exploratory adapted Delphi method and further used specialist consensus to understand pragmatic ways to assess identified indicators.

## 2. Methods

### 2.1. Study design

An adapted Delphi study was used to gain insight into the perceptions of 'specialists' in the field of mental health promotion or physical activity initiatives on these mental health outcomes and assessment strategies, in 2022. Specialists consisted of practitioners and academics because of their dual roles in both applying and researching the fields of mental health and physical activity. This adapted Delphi (Fig. 1) study existed out of two iterative rounds of questionnaires, which acquired both quantitative and qualitative data. The research design allowed for exploration of the mental health outcomes and indicators, as well as rating them according to relevance for the field of community-based HEPA in the European context.

### 2.2. Participants and procedures

Convenience voluntary response sampling and 'snowball' sampling was used where participants were selected across European contexts using the extended professional networks of the authorship who were working as part of a special interest group on Health Enhancing Physical Activity Europe (HEPA Europe), which was funded by the WHO, Europe. Participants were sourced from a European context, including Ireland, the United Kingdom, the Netherlands and Denmark. Europe represents a diverse region with a wide range of cultural, social, and economic contexts and community-based HEPA initiatives are increasingly recognised as important strategies for addressing mental health issues and promoting overall well-being in European populations (OECD/WHO, 2023). The research team intentionally sought to include a diversity of countries, where it was expected that mental health concepts and context may differ on account of cultural influence (Gopalkrishnan, 2018; Joshanloo et al., 2021).

In selecting the panels, a series of prescribed iterative steps were followed (Okoli & Pawlowski, 2004). These were: a list of relevant specialists and respective organisations was developed; individuals from within these organisations were identified; these specialists were approached to further nominate other specialists; the included specialists were categorised based on the nature of their background (academic or practitioner); email invitations were issued to specialists for respective and relevant panels and in order of assigned categories. A two-week recruitment window was observed during recruitment phases.

The inclusion criteria for practitioner participants were those who are professionally delivering or overseeing health enhancing physical activity initiatives in a community setting. The following criteria were used to determine inclusion suitability of initiatives: target vulnerable and marginalised populations at risk of poor mental health; may include participants with mild symptoms of mental disorder; have included at least one outcome of mental health or well-being; incorporate at least one physical activity component in the initiative. The inclusion criteria for academic participants were those who specialised in mental health or HEPA. In this regard, participants were sourced from health institutes, education and higher education institutes, knowledge centres, the statutory sector (e.g. NGOs and community organisations) and mental health centres.

At study conception, the minimum target sample was $N = 16$, divided across two panels (comprised of $N = 8$ practitioners and $N = 8$ academics), providing equal representation from the respective countries, thus allowing for panels to be created based on geographical demographics. This target of eight panellists is drawn from minimum numbers in the literature (Fink-Hafner et al., 2019; McPherson et al., 2018; Okoli & Pawlowski, 2004).

In total, 83 specialists were approached, either directly or via snowballing to participate. The final sample included $N = 10$ academics and $N = 10$ practitioners who participated in the first round of the Delphi study (24.1% response rate; Table 1). Thirteen members of the

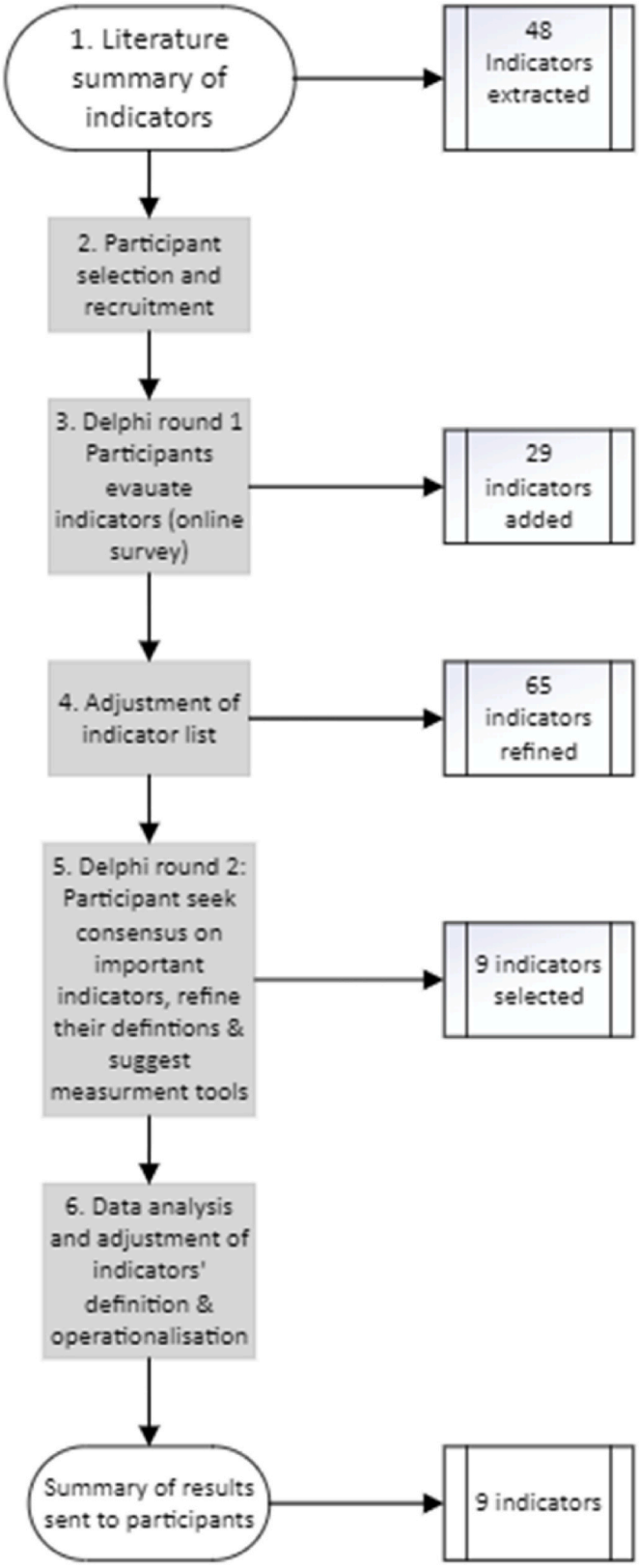


**Fig. 1.** Schematic overview of procedures.

panel finished the second round of questionnaires (64% response rate).

### 2.3. Data collection

To accommodate time constraints inherent to the relevant research funding, a carefully considered predetermined number of two Delphi rounds were communicated to, and subsequently undertaken with participants. Thus, while traditional Delphi methods often involve multiple iterative rounds of participant engagement, this exploratory study implemented a pragmatic adaptation. While diverging from the conventional multi-round Delphi methodology, this tailored approach facilitated valuable insights from specialists in the field, where adapted two round Delphi-methods have been effectively tested in previous works (Clyne et al., 2022; Fernández-Llamazares et al., 2013; Schmalz et al., 2021; Thom et al., 2021). To collect data, participants were presented with a draft questionnaire via the online platform Qualtrics (Qualtrics, Provo, UT, USA), as advocated for in recent guidance on Delphi conduct (McPherson et al., 2018).

#### 2.3.1. Delphi round 1

The first round of this Delphi study was used to identify the relevant mental health indicators, as opposed to indicators not relevant to the field. Initially, participants were asked to conceptualise indicators as either *'significant' or 'actionable'*. Significant indicators have the potential to improve the mental health of a population, and actionable when it provides information on the mental health status and when it can be influenced by public health practice (Thom et al., 2021).

The questionnaire began with two unprompted open questions asking participants to identify mental health indicators they have used in their own initiatives or research outcomes or that they identify as being important. Next, 48 indicators were introduced which were drawn from key literature on mental health promotion and protection (Orpana et al., 2016; Thom et al., 2021), that were identified within a prior rapid review of the literature using key words of 'mental health' AND 'indicators' OR 'determinants'. The indicators were introduced to the participants along with a definition and operational example. The participants were asked to rate indicators based on their perceived level of importance using a 7-point Likert scale (1 = extremely irrelevant; 7 = extremely relevant). Additionally, a comment field allowed participants to comment on any individual indicator. The questionnaire was completed with open space to identify missing indicators for any specific category and further space for general remarks.

#### 2.3.2. Delphi round 2

The round 2 of the Delphi approach was used to prioritise and select the most important indicators. This was commenced by first recapitulating the results from the Delphi study round 1. Following this, participants were presented with two five-point Likert style (1 = strongly disagree; 5 = strongly agree) closed questions regarding perceived need and usage intention of a standardised measurement tool for mental health in delivering health enhancing physical activity programmes.

This was followed by open questions regarding constraints, requirements and structure of a standardised measurement tool. Hereafter, 13–23 grouped indicators were shown per question, and participants were asked to select their perceived most important (zero to five) indicator. Participants were then further questioned regarding the definition and operationalisation of selected indicators. In this regard, participants were asked: "Do you agree with this definition and operationalisation?" This question could be answered with yes or no. Where 'no' was selected, an open question was generated that allowed the participant to present an alternative definition and operationalisation. Lastly, participants were presented with an opportunity to leave comments or pose questions to the researchers.

**Table 1**
Participant information (roles and geographical location).

| | Delphi round 1 | | | Delphi round 2 | | |
|---|---|---|---|---|---|---|
| Country | Academics | Practitioners | Total | Academics | Practitioners | Total |
| The Netherlands | 3 | 3 | 6 | 3 | 2 | 5 |
| Ireland | 1 | 4 | 5 | 1 | 2 | 3 |
| The United Kingdom | 5 | 2 | 7 | 3 | 0 | 3 |
| Denmark | 1 | 1 | 2 | 1 | 1 | 2 |
| **Total** | **10** | **10** | **20** | **8** | **5** | **13** |

### 2.4. Data analysis

The quantitative data was converted from Qualtrics to IBM SPSS Statistics 28, and data were checked for missing data and outliers. Outliers were considered when the values were outside of the calculated range (1st quartile – 1.5 × interquartile range; 3rd quartile +1.5 × interquartile range). The data from one participant was an outlier for 45 out of 49 indicators. A measurement error was suspected, which is why data from this participant were excluded.

The differences between practitioner and academic participants were examined using independent samples *t*-test. No significant differences between groups allowed for both type of participants to be analysed together. Descriptive statistics were conducted across Delphi rounds. For the first questionnaire, frequencies were used to categorise the total list of indicators into categories of relevance based on the work of Thom et al. (2021). The following scale was used to generate classifications: 'Highly relevant indicators' (>75% of the participants rated the indicator as relevant or extremely relevant); 'Relevant indicators' (>50% of the participants rated the indicators as relevant or extremely); 'Moderately relevant indicators' (<50% of the participants rated the indicators as relevant or highly relevant); 'Non-relevant indicators' (>50% of the participants rated the indicators as extremely irrelevant, irrelevant or slightly irrelevant using Likert scoring).

Frequencies were also used for the Round 2 Delphi. A 50% threshold of consensus across panellists, as applied elsewhere (Thom et al., 2021) were used. Widely applied (McPherson et al., 2018), content analysis using frequency counts of words, phrases, and groups of words were applied to qualitative data across Delphi rounds using Atlas. ti software.

### 2.5. Ethical considerations

Research ethics approved from Wageningen University and South East Technological University, Ireland. All panellist participants provided informed consent prior to participating in the research. All data gathered were subject to anonymisation and secure encrypted storage.

## 3. Results

### 3.1. Round 1: relevancy of mental wellbeing indicators

Specialists were asked to list the mental health indicators they have used to assess mental health and wellbeing from the unprompted questions. In total 25 unique indicators were provided with varying dimensions of mental health and wellbeing from the participants. These consisted of.

- Depression, Self-efficacy, Social network (Frequency n = 3)
- Anxiety, Loneliness, Mood, Participation, Social Connectedness, Wellbeing (Frequency n = 2)

**Table 2**
Relevance of mental health indicators, as rated by mental health initiative specialists and practitioners presented in order of relevance.

| Indicators in order of relevance rating by participants (n = 20) | Mean | Std. Deviation |
|---|---|---|
| 1. Physical activity | 6.58 | 0.61 |
| 2. Social support | 6.58 | 0.51 |
| 3. Social network | 6.47 | 0.61 |
| 4. Social inclusion | 6.42 | 0.61 |
| 5. Loneliness | 6.37 | 0.76 |
| 6. Social participation | 6.32 | 0.67 |
| 7. Well-being | 6.22 | 0.65 |
| 8. Depressive disorders | 6.21 | 0.79 |
| 9. Self-worth/self-esteem | 6.21 | 0.63 |
| 10. Self-efficacy | 6.11 | 0.74 |
| 11. Discrimination | 6.11 | 0.66 |
| 12. Self-rated Mental Health | 6.06 | 0.94 |
| 13. Coping | 6.00 | 0.58 |
| 14. Equality | 5.95 | 0.62 |
| 15. Life satisfaction | 5.89 | 0.68 |
| 16. Anxiety disorders | 5.89 | 1.15 |
| 17. Chronic stress | 5.89 | 0.81 |
| 18. Resilience | 5.89 | 0.99 |
| 19. Neighbourhood and social environment | 5.89 | 1.05 |
| 20. Financial security | 5.84 | 1.26 |
| 21. Family relationships | 5.79 | 1.08 |
| 22. Violence | 5.68 | 0.92 |
| 23. Alcohol consumption | 5.68 | 1.06 |
| 24. General health status | 5.68 | 1.16 |
| 25. Mental health status from social contacts | 5.68 | 1.34 |
| 26. Physical environment | 5.68 | 1.16 |
| 27. Mental disorders (total) | 5.63 | 1.42 |
| 28. Suicide | 5.63 | 1.34 |
| 29. Substance use | 5.61 | 1.46 |
| 30. Substance dependence | 5.58 | 1.22 |
| 31. Optimism | 5.58 | 0.84 |
| 32. Mental health literacy | 5.58 | 1.26 |
| 33. Trust | 5.58 | 0.77 |
| 34. Happiness | 5.56 | 1.38 |
| 35. Self-harm | 5.53 | 1.22 |
| 36. Post-traumatic disorders | 5.47 | 1.17 |
| 37. Household income | 5.47 | 1.47 |
| 38. Access to mental health care | 5.47 | 1.58 |
| 39. Nutrition | 5.42 | 1.22 |
| 40. Household composition | 5.37 | 1.50 |
| 41. Working life | 5.37 | 1.17 |
| 42. Psychotic disorders | 5.32 | 1.38 |
| 43. Learning & development | 5.26 | 0.93 |
| 44. Work environment | 5.21 | 0.86 |
| 45. Emotional intelligence | 5.11 | 0.94 |
| 46. Existential fears | 5.05 | 1.31 |
| 47. Spirituality | 4.26 | 1.45 |
| 48. Political Participation | 4.11 | 1.10 |

7 point Likert scale: 1 = extremely irrelevant, 2 = irrelevant, 3 = slightly irrelevant, 4 = neither relevant nor irrelevant, 5 = slightly relevant, 6 = relevant, 7 = extremely relevant.

**Table 3**
Indicators categorised by the socio-ecological model and relevance as well as additional new indicators proposed by participants.

| Indicators (n=66) categorised by socio-ecological model | Indicator Relevance |
|---|---|
| **Positive Mental Health** | |
| 1. Self-rated mental health | Highly Relevant |
| 2. Life satisfaction | Highly Relevant |
| 3. Well-being (Hedonic & Eudemonic) | Highly Relevant |
| 4. Happiness | Relevant |
| 5. Physical self-perceptions | New indicator |
| 6. Enjoyment | New indicator |
| **Mental Health Problems** | |
| 1. Depressive disorders | Highly Relevant |
| 2. Anxiety disorders | Highly Relevant |
| 3. Post-traumatic stress disorder | Relevant |
| 4. Alcohol & substance dependence | Relevant |
| 5. Mental disorders | Relevant |
| 6. Suicide | Relevant |
| 7. Self-harm | Relevant |
| 8. Stress | Relevant |
| 9. Psychotic disorders | Moderately Relevant |
| 10. Previous substance dependence | New indicator |
| 11. Severe mental illness | New indicator |
| 12. Subjective cognitive problems | New indicator |
| 13. Other addictions | New indicator |
| 14. Burn-out | New indicator |
| 15. Dementia | New indicator |
| **Individual level** | |
| 1. Physical activity | Highly Relevant |
| 2. Control | Highly Relevant |
| 3. Self-efficacy | Highly Relevant |
| 4. Coping | Highly Relevant |
| 5. Self-worth/self-esteem | Highly Relevant |
| 6. Loneliness | Highly Relevant |
| 7. Education | Relevant |
| 8. Nutrition | Relevant |
| 9. Substance use | Relevant |
| 10. General health status | Relevant |
| 11. Resilience | Relevant |
| 12. Optimism | Relevant |
| 13. Mental health literacy | Relevant |
| 14. Existential fears | Relevant |
| 15. Spirituality | Moderately Relevant |
| 16. Emotional intelligence | Moderately Relevant |
| 17. Tobacco use | New indicator |
| 18. Nature connectedness | New indicator |
| 19. Isolation | New indicator |
| 20. Confidence | New indicator |

| | |
|---|---|
| **Family level** | |
| 1. Household composition | Relevant |
| 2. Family relationships | Relevant |
| 3. Mental health status from family | Relevant |
| 4. Household income/poverty/financial security | Relevant |
| 5. Living status | New indicator |
| 6. Living accommodation | New indicator |
| 7. Living conditions | New indicator |
| 8. Sexual well-being | New indicator |
| 9. Immigration status | New indicator |
| 10. Domestic violence | New indicator |
| **Community level** | |
| 1. Social participation | Highly Relevant |
| 2. Social network | Highly Relevant |
| 3. Social support | Highly Relevant |
| 4. Neighbourhood built environment | Highly Relevant |
| 5. Neighbourhood social environment | Highly Relevant |
| 6. Trust | Very Relevant |
| 7. Occupation/work environment | New indicator |
| 8. Social connection | New indicator |
| 9. Volunteering | New indicator |
| **Structural level** | |
| 1. Equality | Highly Relevant |
| 2. Social inclusion | Highly Relevant |
| 3. Discrimination | Highly Relevant |
| 4. Access to mental health care | Relevant |
| 5. Political participation | Moderately Relevant |
| 6. Access to support for caring responsibilities | New indicator |

Highly relevant indicators: More than 75% of the participants rated the indicator as relevant or extremely relevant. Relevant indicators: More than 50% of the participants rated the indicators as relevant or extremely relevant. Moderately relevant indicators: Less than 50% of the participants rated the indicators as relevant or highly relevant. Non-relevant indicators: More than 50% of the participants rated the indicators as extremely irrelevant, irrelevant or slightly irrelevant. New indicators: Indicators the participants thought were missing in the list of indicators.

- Quality of Life, Identity, Confidence, Addiction, Eating Disorders, Emotional Stability, Life Satisfaction, Life Enjoyment, Perseverance, Social Skills, Stress, Resilience, Self-esteem, Sense of belonging, Social Capital and Suicidal Ideation (Frequency n = 1).

Participants were requested to rate the list of 48 indicators provided for level of relevance on a 7-point Likert scale (extremely irrelevant to extremely relevant). Table 2 provides a list of the 48 indicators in order of perceived rated relevance based on the response of participants (see Table 3).

Following this, to assist with identifying key outcome measures for specific initiatives, indicators were grouped according to the socio-ecological model (Golden & Earp, 2012; Sallis et al., 2008). Of the 48 indicators, 34.7% were perceived as 'highly relevant', 55.1% as 'relevant' and 10.2% as 'moderately relevant'. No indicators were rated as 'not relevant' by participants during this initial round of the Delphi study. In addition, participants proposed 29 new indicators they believed were missing from the original list. Consensus was then reached on the removal of duplicates, indicator merging and splitting. This resulted in a final list comprising of 66 indicators.

### 3.2. Round 2: consensus on important indicators, definition and operationalisation

To gain insight into the most important indicators, participants selected indicators they perceived as most important. Considering the heterogeneity of contextual factors, and the exploratory nature of this work which sought to gather initial input from specialists, a consensus of 50% was set, similar to Thom et al. (2021). The count and percentage of consensus for each indicator is shown in Table 4.

Nine indicators were deemed of importance through consensus: Self-Rated Mental Health, Life Satisfaction, Stress, Physical Activity Levels, Loneliness, Social Participation, Social Network, Social Support and Social Connection.

### 3.3. Defining and measuring the most important outcomes

For the indicators above the consensus threshold, participants were asked to agree on a definition for each indicator at which point each indicator definition was updated. Participants were also invited to suggest what they perceived as the most operational methods for measuring these outcomes in practice (see Table 5).

### 3.4. Perceptions of using standardised measurement tools

Round 2 of the Delphi process where participants were offered open qualitative fields regarding perceptions of using standardised measurement tools for mental health and wellbeing during HEPA initiatives, indicated that a majority of participants placed value on standardised measurement tools. Ten out of thirteen participants expressed a perceived value from using standardised measurement tools.

Participants also eluded to constraints in using existing standardised monitoring tools for mental health. For instance, cultural and contextual differences were noted among homogenous measurement tools. Seven participants expressed this concern:

> *"There are too many different organisations within countries, governments, health service organisations, variances between countries, differences in social perceptions of mental health, language interpretations, cultural and social differences"* (Academic panellist).

> *"Cultural and contextual differences within Europe and language differences influence how measurement tools will be used"* (Practitioner panellist).

**Table 4**
Indicators by order of consensus on importance.

| Indicator | Count | Consensus (%) |
|---|---|---|
| Self-rated mental health | 9 | 69.2[a] |
| Physical activity | 9 | 69.2[a] |
| Life satisfaction | 7 | 53.8[a] |
| Stress | 7 | 53.8[a] |
| Loneliness | 7 | 53.8[a] |
| Social participation | 7 | 53.8[a] |
| Social network | 7 | 53.8[a] |
| Social support | 7 | 53.8[a] |
| Social connection | 7 | 53.8[a] |
| Social inclusion | 6 | 46.2 |
| Well-being (Hedonic & Eudemonic) | 5 | 38.5 |
| Happiness | 5 | 38.5 |
| Alcohol & substance dependence | 5 | 38.5 |
| Self-efficacy | 5 | 38.5 |
| Coping | 5 | 38.5 |
| Household income/poverty/financial security | 5 | 38.5 |
| Access to mental health care | 4 | 30.8 |
| Enjoyment | 4 | 30.8 |
| Anxiety disorders | 4 | 30.8 |
| Mental disorders | 4 | 30.8 |
| Healthy lifestyle: Nutrition, Substance use, Tobacco use | 4 | 30.8 |
| Resilience | 4 | 30.8 |
| Family relationships | 4 | 30.8 |
| Neighbourhood built environment | 4 | 30.8 |
| Neighbourhood social environment | 4 | 30.8 |
| Physical self-perceptions | 3 | 23.1 |
| Self-worth/self-esteem | 3 | 23.1 |
| Confidence | 3 | 23.1 |
| Mental health status from family | 3 | 23.1 |
| Trust | 3 | 23.1 |
| Volunteering | 3 | 23.1 |
| Equality | 3 | 23.1 |
| Discrimination | 2 | 15.4 |
| Depressive disorders | 2 | 15.4 |
| Burn-out | 2 | 15.4 |
| Isolation | 2 | 15.4 |
| Living status/accommodation/conditions | 2 | 15.4 |
| Control | 1 | 7.7 |
| Mental health literacy | 1 | 7.7 |
| Household composition | 1 | 7.7 |
| Sexual well-being | 1 | 7.7 |
| Post-traumatic stress disorder | 0 | 0.0 |
| Access to support for caring responsibilities | 0 | 0.0 |
| Suicide | 0 | 0.0 |
| Self-harm | 0 | 0.0 |
| Previous substance dependence | 0 | 0.0 |
| Severe mental illness | 0 | 0.0 |
| Subjective cognitive problems | 0 | 0.0 |
| Other addictions | 0 | 0.0 |
| Dementia | 0 | 0.0 |
| Education | 0 | 0.0 |
| Optimism | 0 | 0.0 |
| Existential fears | 0 | 0.0 |
| Nature connectedness | 0 | 0.0 |
| Immigration status | 0 | 0.0 |
| Domestic violence | 0 | 0.0 |

[a] Consensus on importance reached.

At the same time, through their responses, participants detailed requirements they believed were pertinent in the development and application of standardised mental health monitoring tools for HEPA initiatives. For instance, participants noted the value of availability of different languages.

> *"If such a tool is developed, it must also be translated into the different languages. And it must be applicable to the typical settings in every country"* (Practitioner panellist).

According to three participants, there is a need for standardised approaches to undergo robust validation before being adopted in practice. Other participants remarked on the importance of such tools being freely available and open access for practitioners.

**Table 5**
Agreement on indicator definitions by Delphi participants and suggested measurement tools.

| Indicator | Definition | % Agreement | Suggested measurement tool by participants |
|---|---|---|---|
| *Life satisfaction* | Construct of subjective wellbeing: The degree to which a person evaluates their overall quality of life as a whole, rather than their current feelings | 100 | A Single-item measure of life satisfaction, 11-point scale (Office of National Statistics, 2018)<br>The Satisfaction with Life Scale (five item scale; Diener et al., 1985) |
| *Loneliness* | Loneliness can be defined as the state of feeling sad about being or feeling alone | 100 | 3-item UCLA loneliness scale (a 3-item scale measuring dimensions of loneliness: relational connectedness, social connectedness and self-perceived isolation; Hughes et al., 2004; Russell, 1996) |
| *Self-rated mental health* | The perception of an individual about their overall mental health | 100 | A single item measure of self-rated mental health (five-point scale from excellent to poor; Ahmad et al., 2014)<br>The Mental Health Inventory (MHI-5, 5 scale, subscale of the Short Form-36; Berwick et al., 1991) |
| *Social support* | How a person perceives family, friends and others as available sources to provide psychological, material, and overall support during times of need. | 100 | Multidimensional Scale of Perceived Social Support (MSPSS; 12-item scale, measuring perceptions of support from 3 sources: Family, Friends, and a Significant Other; Zimet et al., 1988) |
| *Social connection* | The sense of belonging and subjective bond (psychological, emotional, social and spiritual) that people feel in relation to individuals and groups of others. | 86 | The social connectedness scale-Revised (8-item scale measuring feelings of connectedness within the social environment; Lee & Robbins, 1995) |
| *Social network* | The network of social interactions and relationships of a person. | 83 | Social Network Index (13-item questionnaire; Cohen et al., 1997)<br>Lubben Social Network Scale (6 or12 item scale; Lubben, 1988) |
| *Stress* | Stress is a physical and emotional reaction that people experience as they encounter challenges in life (or environmental or physical pressure) e. g. violence, discrimination or financial constraints | 57 | Single item measure of stress (5-point Likert t scale varying from "not at all" to "very much"; Elo et al., 2003)<br>The Perceived Stress Scale (a 10-item questionnaire; Cohen et al., 1983) |
| *Physical activity* | Any bodily movement produced by skeletal muscles that requires energy expenditure. | 44.4 | Single item measure of days being physically active (8 point scale; Milton et al., 2011)<br>International Physical Activity Questionnaire – Short Form (IPAQ-SF; records the activity of |

(*continued on next page*)

**Table 5** (*continued*)

| Indicator | Definition | % Agreement | Suggested measurement tool by participants |
|---|---|---|---|
| | | | four intensity levels: 1) vigorous-intensity activity such as aerobics, 2) moderate-intensity activity such as leisure cycling, 3) walking, and 4) sitting; Craig et al., 2003; Lee et al., 2011) |
| *Social participation* | A person's involvement in social activities that provide interactions with others in the community. | 42.8 | Assessment of Life Habits - (LIFE-H; includes 12 categories; Nutrition, Fitness, Personal Care, Communication, Housing, Mobility, Responsibilities, Interpersonal Relationships, Community Life, Education, Employment, Recreation, can be used as a whole or as separate sub-sections; Fougeyrollas et al., 1998) |

> *"A requirement is robust validation. Leading researchers must be committed to use it, no matter how good it is, if nobody uses it, you cannot compare"* (Academic panellist).

The panellists provided input on the structure and looks of a future standardised measurement tool. Three options were given, a pool of indicators, a fixed questionnaire and a visual form. A pool of indicators was brought forward by four participants. This scale would include fixed indicators, with the possibility to add other indicators. One of the four participants also added the possibility for qualitative measures next to the scale. Seven participants favoured a fixed questionnaire style.

## 4. Discussion

Poor mental health is a growing problem with respect to individual and societal impact (Vigo, Thornicroft, & Atun, 2016). In the context of increasingly resource starved community-based mental health outlets (Liese et al., 2019; OECD, 2018), and a lack of mental health services globally, HEPA initiatives have the potential to improve population mental health. Previous research and public health guidance stresses the importance of physical activity for mental health (Schuch et al., 2018). Further, community-based HEPA initiatives can be delivered easily and engage creativity among participants with growing evidence to support their effectiveness for improving mental health (Heissel et al., 2023). There is a need to enhance the evidence base through the measuring of mental health and wellbeing outcomes to demonstrate impact and justify the resourcing of community-based HEPA for those at risk of mental health problems (Tweed et al., 2021). Not surprisingly, community based initiatives that promote HEPA are increasingly being utilised in the pursuit of mental health promotion at a population level due in part to their accessibility (Dunne et al., 2021).

Robust evaluation on community-based HEPA initiatives are vital in the understanding outcomes of effect, implementation and impact among the populations most in need (Fynn et al., 2020; Kosowan et al., 2022). There have been calls within the literature to understand the impact and justify resourcing with specific regard for mental health and wellbeing outcomes through community based HEPA (Tweed et al., 2021) Evaluations in this context have previously been shown as complex due to their heterogeneity (Fynn et al., 2020). Mental health and wellbeing encompasses a multidimensional phenomena (Fusar-Poli et al., 2020; Zaman et al., 2019). Unsurprisingly, this issue creates monitoring and evaluation related challenges for practitioners in real world settings (Murphy et al., 2023). In the absence of all-encompassing guidance in relation to an internationally recognised and standardised approaches for carrying out this monitoring of pertinent mental health outcomes (Kosowan et al., 2022), the current research seeks to reduce the 'noise' surrounding mental health indicators that have less relevance in the community HEPA field as perceived by specialist panellists. In the current research, specialist participants were invited to reach consensus regarding a wide range of key mental health and wellbeing indicators thereby offering insight as to valuable indicator outcomes that must be taken into consideration during the evaluation of community-based HEPA in European contexts. This research highlights the volume and diversity of existing mental health indicators, and further demonstrates a need to support community-based practitioners in using specific mental health indicators of relevance during community-based HEPA (Cooper et al., 2021; Harris, 2018).

It is particularly interesting to note that in the first round of this Delphi process, the indicator with the highest mean relevance, was 'Physical activity', which received rating above more traditional mental illness related indicators and symptoms related indicators, such as 'chronic stress', 'depressive disorder', and 'anxiety disorder'. This finding may indicate a promising outcome with respect to a broader reflection of an acknowledgment and awareness among professionals of the role of PA in the protection of mental health at the population and community level (Ibáñez Román et al., 2023). It should however be considered that the professionals in the current research were community-based practitioners working in a physical activity domain with people that may be at increased risk of poor mental health, and are thus likely that consider physical activity inherently beneficial for health and wellbeing. In the clinical mental health context, there is increasingly a need for mental health professionals to advise on the mental health benefits of exercise and physical activity (Romain et al., 2020). In looking to the broader population at large, while European research on the matter is lacking, there is evidence from Australia of a growing permeation of mental health literacy, including an awareness regarding the benefit of exercise among the general population (Stanton et al., 2019). Previously, community sports facilities in Northern Ireland have also been identified as feasible settings from which mental health awareness training can be delivered (Breslin et al., 2017), thus indicating potential public mental health opportunity through such community based organisations that promote HEPA.

It is further important to note that four of the most highly rated indicators were related to social capital (social participation, social network, social support and social connection). Many 'hard to reach' populations, such as young persons (Morgan et al., 2021), and migrant populations (Bamford et al., 2021), report enhanced social capital as important for sustained good mental health, and lack thereof is associated with poorer mental health states. Among clinical populations with established mental health difficulty, community based physical activity and recreation have been shown to promote social cohesion and support experienced recovery with respect to mental health (Fenton et al., 2017). In this way, understanding multidimensional aspects of social capital would seem important considerations for community based HEPA practitioners. Monitoring tools in this regard need to be capable of accounting for the complexity of social capital.

Clinical and research funding bodies, such as National Institute of Mental Health and Wellcome Trust have moved to support standardisation of mental health outcome assessment across contexts (Farber et al., 2020). While this move is in alignment to the views of participants in the current research, there have been concerns raised with respect risk of reductionist conceptualisation of common mental health problems (Patalay & Fried, 2021). In the current work, subsequent grouping of indicators using the socio-ecological model showed no indicators within

the category of 'not relevant' as perceived by the participants. In this regard, the breath and diversity across relevant mental health and wellbeing indicators is evident. Such findings reflect an emergent discourse in mental health literature generally that accounts for multi-dimensional aspects of mental health beyond the mere absence of clinical mental health diagnoses (Fusar-Poli et al., 2020; Galderisi et al., 2015).

With respect to the most important indicators as reported by participants, self-rated mental health received 'consensus' in addition to Life Satisfaction, Stress, Physical Activity Levels, Loneliness, Social Participation, Social Network, Social Support and Social Connection. The finding of self-rated mental health in the context of the current sample is promising. In this way, this finding may reflect an awareness among community practitioners regarding the multidimensional and individualistic nature of mental health. Further, the findings within subsequent qualitative data gathered in this research point to an awareness of a need for culturally sensitive measurement approaches in practice. Within the literature, there has been growth in the use of methods that seek to understand and foster cultural sensitivity in the context of PA promotion in certain populations (Aschbrenner et al., 2019; Matthews et al., 2022).

## 5. Strengths and limitations

This research has also brought evidence to the fore in relation to mental health and wellbeing monitoring and evaluation approaches that are currently being employed in the European context. In this way a Delphi method was applied to a European sample to examine consensus on mental health indicators that should be pragmatically monitored as part of community based HEPA. In the current research, an adapted Delphi method was applied. Delphi methods in health sciences can offer flexibility in statistical analyses (Shang, 2023), and offer flexibility in their design make-up (Fink-Hafner et al., 2019), which an adapted Delphi design in this study facilitated a pragmatic approach to data collection. While there remains some contention in relation to appropriate sample size in Delphi studies (Shang, 2023), the relatively small sample size warrants consideration in interpreting the current research. Adapting the Delphi methodology can be both a strength in terms of its appropriateness for the topic and context and a limitation in terms of reduced rounds to reach consensus. The limited number of Delphi rounds used in the current research may have further inhibited clear consensus being reached across certain indicators. Moreover, the limited demographic information gathered on specialists panellists to protect anonymity, and the omission of people with lived experience of mental health difficulty, are likely to bear influence on the finding interpretation and addressed in future research. That said, the current research seeks only to offer exploratory efforts regarding key mental health indicators used in community-based HEPA. In this regard, this research should not be considered all-encompassing and or definitive in its findings.

## 6. Conclusion

An adapted Delphi study with key HEPA academic and practitioner specialists study here shows that self-rated mental health (69.2%), physical activity (69.2%) life satisfaction (53.8%), stress (53.8%), loneliness (53.8%), social participation, network, connection and support (53.8%) were the top-rated indicators in terms of relevance for the evaluation of HEPA initiatives. No consensus on a standardised measurement tool was reached, although specialists pointed to the need for culturally sensitive measurement tools. This research points to a likely low consensus in relation to ways of evaluating mental health and wellbeing outcomes from HEPA in the European context. Further research is recommended to develop guidance on pragmatic measurement tools that can be utilised across other European countries.

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## CRediT authorship contribution statement

**Aisling McGrath:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **Evan Matthews:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Data curation, Conceptualization. **Niamh Murphy:** Writing – review & editing, Project administration, Funding acquisition, Conceptualization. **Ilse Oostveen:** Writing – original draft, Methodology, Investigation, Formal analysis, Data curation. **Annemarie Wagemakers:** Writing – review & editing, Supervision, Project administration. **Kirsten Verkooijen:** Writing – review & editing, Supervision, Resources, Project administration, Methodology, Funding acquisition, Conceptualization.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

Data will be made available on request.

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