RunIn3: The development process of a running-related injury prevention program

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Appendix A

Definition of terms related to behavioral science

Terms	Meaning
Behavioral outcomes	*"The behaviors that influence the risk of the health problem."* [a]
Determinants of behaviors outcomes	*"The personal and environmental determinants that influence behaviors."* [a]
Performance objectives	*"Performance objectives are statements of what a participant will do or how the individual will modify the environment."* [a]
Change objectives	*"Specify what needs to change in the determinants of behavioral outcomes to accomplish the performance objectives, further delineating the logic of change."* [a]
Focus group	*"A small set of people, typically 4 to 12 in number, who share characteristics and are selected to discuss a topic of which they have personal experience. A leader conducts the discussion and keeps it on target while also encouraging free-flowing, open-ended debate."* [b]
Theory of Reasoned Action	*"The theory that attitudes toward a behavior and subjective norms (perceived expectations) regarding a behavior determine a person's intention to perform that behavior. Intentions are in turn assumed to cause the actual behavior. Also called reasoned action model."* [b]
Knowledge	*"The state of being familiar with something or aware of its existence, usually resulting from experience or study."* [b]
Attitude	*"Attitudes provide summary evaluations of target objects and are often assumed to be derived from specific beliefs, emotions, and past behaviors associated with those objects."* [b]
Subjective norm	*"A perception that an individual has regarding whether people important to that individual believe that he or she should or should not perform a particular behavior."* [b]
Self-efficacy	*"An individual's subjective perception of his or her capability to perform in a given setting or to attain desired results, proposed by Albert Bandura as a primary determinant of emotional and motivational states and behavioral change. Also called perceived self-efficacy."* [b]
Skills	*"An ability or proficiency acquired through training and practice. Motor skills are characterized by the ability to perform a complex movement or serial behavior quickly, smoothly, and precisely. Skills in other learned tasks include basic skills, communication skills, and social skills."* [b]

[a]Bartholomew Eldredge, L. K., Markham, C. M., Ruiter, R. A. C., Kok, G., & Parcel, G. S. (2016). *Planning Health Promotion Programs: An Intervention Mapping Approach* (4ed.): Jossey-Bass Public Health.
[b]Dictionary of psychology, American Psychological Association. Available at: https://dictionary.apa.org. Accessed 18 Jun 2019.

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Appendix B

Consolidated Criteria for Reporting Qualitative Research (COREQ) 32-item

Domain 1: Research team and reflexivity

Personal Characteristics

1. Interviewer/facilitator: Which author/s conducted the interview or focus group?

    LH was the moderator, CSV was a facilitator, GMO and GAKM were assistants.

2. Credentials: What were the researcher's credentials?

    LH is a certified physical therapist, and he got his PhD in Public Health. CSV is a certified physical therapist and a PhD candidate in Physical Therapy. GMO is a certified physical therapist and a candidate to the master's degree in Physical Therapy. GAKM is a undergraduate candidate to the bachelor's degree in Physical Therapy performing a scientific internship within this research project.

3. Occupation: What was their occupation at the time of the study?

    LH is a Full Professor of the Masters and Doctoral Programs in Physical Therapy of the Universidade Cidade de São Paulo (UNICID). CSV, GMO and GAKM are PhD, Masters and Scientific Initiation candidates under supervision of LH, respectively.

4. Gender: Was the researcher male or female?

    LH and CSV are men, GMO and GAKM are women.

5. Experience and training: What experience or training did the researcher have?

    LH has formal training in Intervention Mapping. LH has formal training in Dissemination & Implementation Science. LH conducted a study with similar methods between 2015 and 2018.

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Relationship with participants

6. Relationship established: Was a relationship established prior to study commencement?

> Yes, a relationship was established either by e-mail or text message (smartphone or social media) prior to study commencement. In addition, LH already knew the participants prior to study commencement.

7. Participant knowledge of the interviewer: What did the participants know about the researcher?

> The participants knew LH and he is a researcher in the field of sports injury prevention.

8. Interviewer characteristics: What characteristics were reported about the interviewer/facilitator?

> LH is a researcher in the field of sports injury prevention, and he has experience in running-related injuries and process evaluation.

Domain 2: study design

Theoretical framework

9. Methodological orientation and Theory: What methodological orientation was stated to underpin the study?

> Semantic thematic approach following a quantitative content analysis orientation based on inductive reasoning.

Participant selection

10. Sampling: How were participants selected?

> By convenience.

11. Method of approach: How were participants approached?

> Invitation by e-mail and/or text message (smartphone or social media).

12. Sample size: How many participants were in the study?

    10.

13. Non-participation Setting: How many people refused to participate or dropped out? Reasons?

    5 people refuse the invitation due to conflicting agenda.

14. Setting of data collection: Where was the data collected?

    The data was collected at the Universidade Cidade de São Paulo (UNICID).

15. Presence of non-participants: Was anyone else present besides the participants and researchers?

    No.

16. Description of sample: What are the important characteristics of the sample?

    All participants were located and have been working in the Metropolitan Region of São Paulo, Brazil. They were runners, coaches, health professionals, researchers and stakeholders.

Data collection

17. Interview guide: Were questions, prompts, guides provided by the authors? Was it pilot tested?

    A guide was developed and extensively revised by the research team [**Appendix C**].

18. Repeat interviews: Were repeat interviews carried out? If yes, how many?

    No.

19. Audio/visual recording: Did the research use audio or visual recording to collect the data?

    We used audio recording to collect the data.

20. Field notes: Were field notes made during and/or after the interview or focus group?

    The facilitator (CSV) carried out the field notes to facilitate the transcriptions.

21. Duration: What was the duration of the interviews or focus group?

> There were conducted 3 meetings with an average duration of 2.5 hours and with an average interval of four weeks between the meetings.

22. Data saturation: Was data saturation discussed?

> Yes, when the topic was saturated, the moderator (LH) changed the content to be discussed.

23. Transcripts returned: Were transcripts returned to participants for comment and/or correction?

> No.

Domain 3: analysis and findings

Data analysis

24. Number of data coders: How many data coders coded the data?

> 2 coders (CSV and GMO) coded the data.

25. Description of the coding tree: Did authors provide a description of the coding tree?

> No.

26. Derivation of themes: Were themes identified in advance or derived from the data?

> The themes were derived from the data.

27. Software: What software, if applicable, was used to manage the data?

> R version 3.3.3 and RQDA package to qualitative data analysis.

28. Participant checking: Did participants provide feedback on the findings?

> Yes, the participants had the opportunity to revise the proposed final product in the last focus group meeting, when the research group presented the prototype of the program to the participants encouraging an open discussion on the matter.

Reporting

29. Quotation presented: Were participant quotations presented to illustrate the themes / findings? Was each quotation identified?

> No.

30. Data and findings consistent: Was there consistency between the data presented and the findings?

> Extensive discussions were held among the researchers (LH, CSV and GMO) until a consensus was reached. Therefore, yes, we believe that there was consistency between the data presented and the findings.

31. Clarity of major themes: Were major themes clearly presented in the findings?

> Yes, major themes were clearly presented in the findings in form of tables.

32. Clarity of minor themes: Is there a description of diverse cases or discussion of minor themes?

> Extensive discussions were held among the researchers (LH, CSV and GMO) about minor themes (performance objectives), which were described in **Appendix E**.

Reference

1. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 2007;19(6):349-57. doi: 10.1093/intqhc/mzm042

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Appendix C

The semi-structured guide for the focus group meetings

1. Number of participants:
Between 4 and 12 participants.

2. Duration:
Between 1 and 3 hours.

3. Moderator:
LH.

4. What we want to know?
- Risk behaviors towards running-related injuries;
- Determinants of risk behaviors towards running-related injuries;
- What changes risk behaviors towards running-related injuries;
- Preventive behaviors towards running-related injuries;
- Determinants of preventive behaviors towards running-related injuries;
- What changes preventive behaviors towards running-related injuries.

5. Rules and details:
Two or more individuals cannot talk at the same time; this makes it difficult to transcribe the audio.

6. Presentation of evidence:
Presentation, in slideshow, of a general and impartial overview about the evidence on the prevention of running-related injuries.
Ministered by LH.
Duration (30–45 min).

7. Questions:
Avoid dichotomous questions;
From 8 to 12 questions.

7.1. Opening:
Promote interaction and encourage everyone to talk.
> **a)** "Briefly, would you like to introduce yourselves and to tell what you do? (Training, occupation or function that you think relates to injury prevention, running or research)".

7.2. Introduction:

Introduce the subject to be discussed and get to know the level of understanding of the participants with regard to the previous presentation.

> **b)** "After the presentation, what do you think about the prevention of running-related injuries?"

7.3. Transition:

Direct to the questions of interest.

> **c)** "What would be the influence of the runners' behaviors that could lead to running-related injuries or could protect the runners to develop running-related injuries?"

7.4. Exploratory/key questions:

Questions of Interest.

> **d)** "What are the behaviors adopted by runners who increase their exposure to risk factors of running-related injuries? That is, risk behavior."

> **e)** "What do you think that drives runners to adopt these behaviors?"

> **f)** "What are the behaviors adopted by runners who reduce their exposure to risk factors of running-related injuries? That is, preventive behavior."

> **g)** "What do you think that drives runners to adopt these behaviors?"
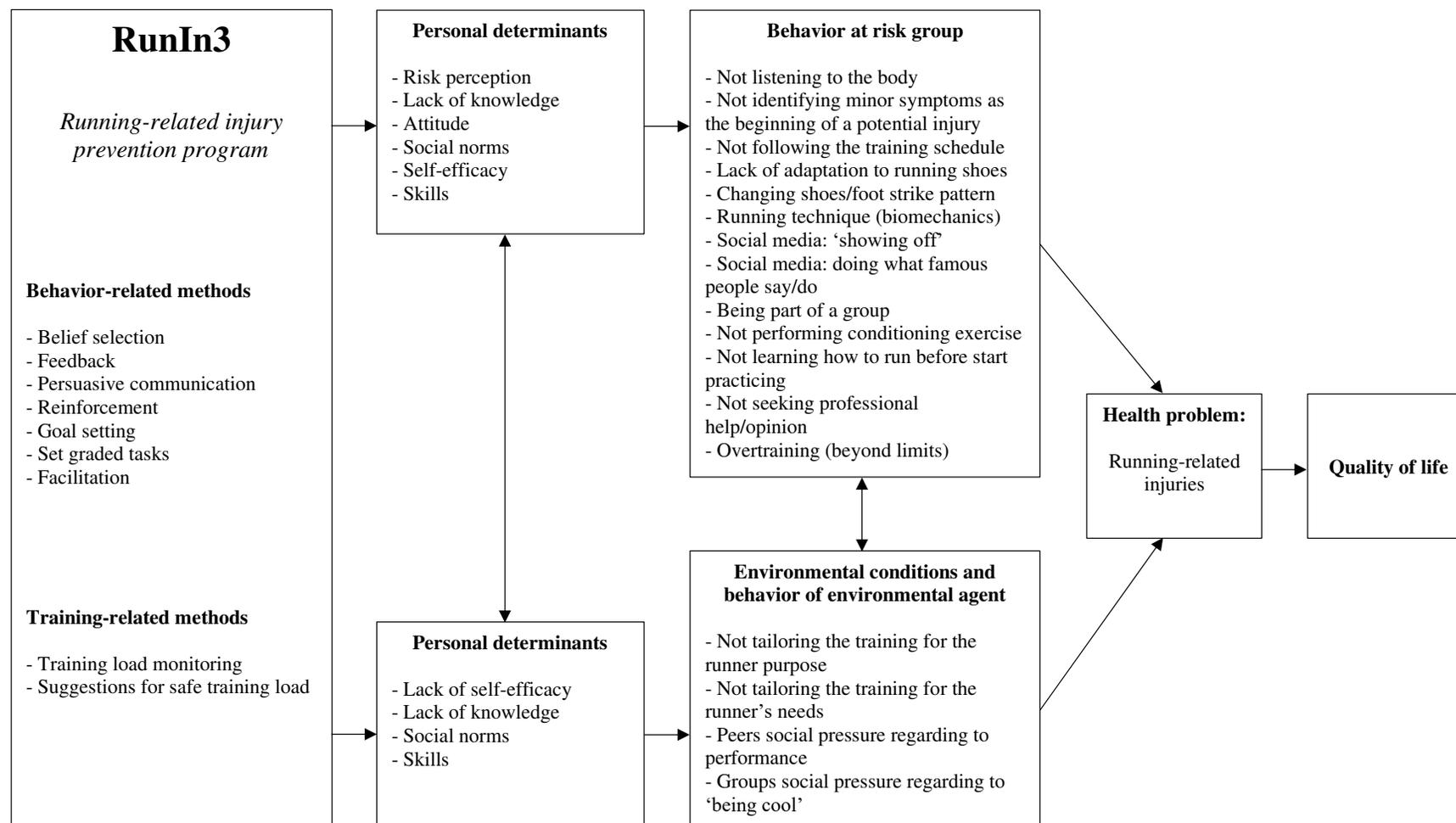
7.5. Closure:

Summarize the subject and make sure there are no pending issues.

> **h)** "How an ideal running-related injury prevention program should look like?"

> **i)** "Have we forgotten something or would you like to add something?"

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Appendix D

Needs assessment PRECEDE logic model
PRECEDE: Predisposing, Reinforcing, and Enabling Constructs in Educational Diagnosis and Evaluation

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Running-related injury prevention program

Behavior-related methods

- Belief selection
- Feedback
- Persuasive communication
- Reinforcement
- Goal setting
- Set graded tasks
- Facilitation

Training-related methods

- Training load monitoring
- Suggestions for safe training load

Personal determinants

- Risk perception
- Lack of knowledge
- Attitude
- Social norms
- Self-efficacy
- Skills

Personal determinants

- Lack of self-efficacy
- Lack of knowledge
- Social norms
- Skills

Behavior at risk group

- Not listening to the body
- Not identifying minor symptoms as the beginning of a potential injury
- Not following the training schedule
- Lack of adaptation to running shoes
- Changing shoes/foot strike pattern
- Running technique (biomechanics)
- Social media: 'showing off'
- Social media: doing what famous people say/do
- Being part of a group
- Not performing conditioning exercise
- Not learning how to run before start practicing
- Not seeking professional help/opinion
- Overtraining (beyond limits)

Environmental conditions and behavior of environmental agent

- Not tailoring the training for the runner purpose
- Not tailoring the training for the runner's needs
- Peers social pressure regarding to performance
- Groups social pressure regarding to 'being cool'

Health problem:

Running-related injuries

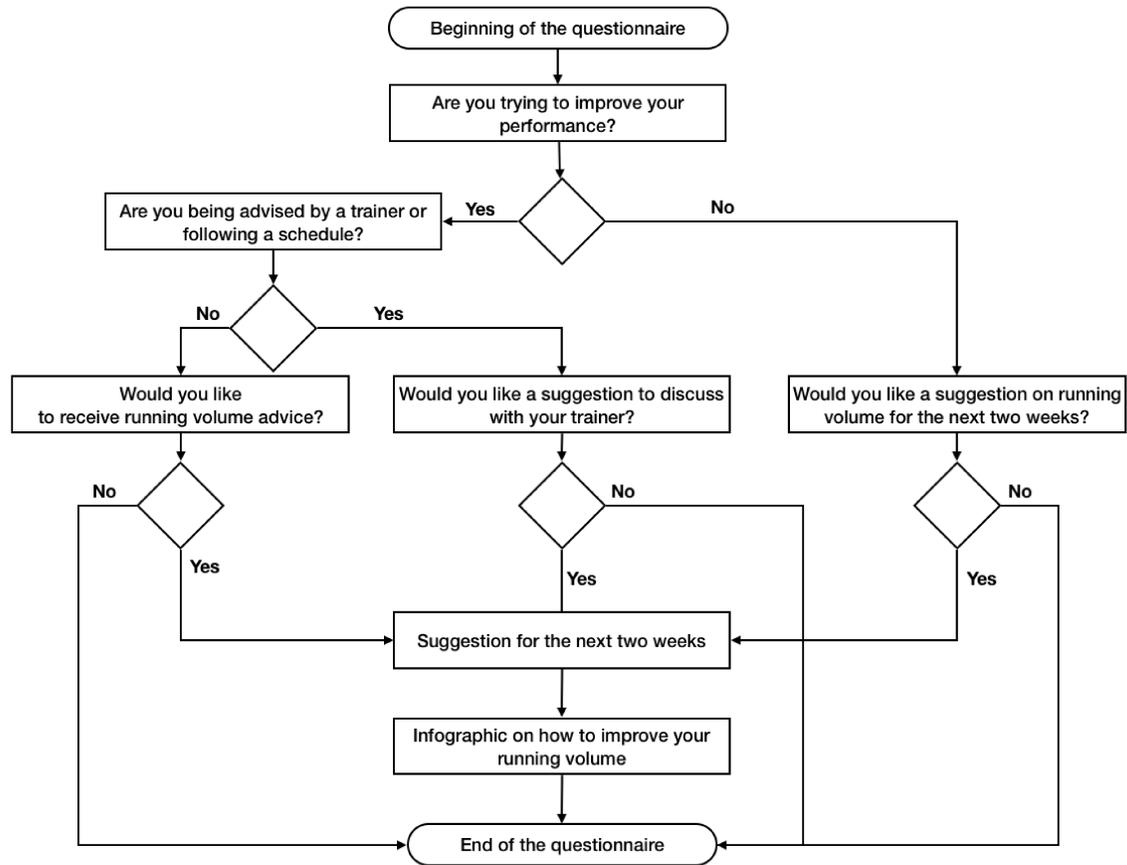**Quality of life**

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Appendix E

Matrix of change objectives for behavioral outcomes of at-risk group

Performance Objectives	Personal determinants of behavioral outcome[a]		
	Self-efficacy	*Skills*	*Knowledge*
To know how to identify minor symptoms in the beginning of a potential injury	–	–	To understand when a minor injury may be a matter of concern
To establish contact with health professionals	–	–	To understand the importance of having contact with health professionals for the prevention of running-related injuries
To identify when it is necessary to seek professionals' opinions/help	–	–	To understand when it is recommended to seek professionals' opinions/help
To have a training schedule	–	–	To understand how to get a training schedule
To know the importance of following and the consequences of not following (more and less) the training schedule	–	–	To understand the consequences of not following the training schedule (e.g., overtraining and lack of recovery in appropriate time can lead to overuse injuries)
To demonstrate self-control to follow a training schedule	To develop self-control in keeping the training schedule	–	–
To know that comfort is the most important factor for choosing running shoes	–	–	To understand that comfort should be the most important factor when choosing running shoes
To know that there is no right foot strike	–	–	To understand that there is no right or wrong foot strike pattern
To know the importance of performing conditioning exercises	–	–	To understand why conditioning exercises are important for the prevention of running-related injuries
To know how to perform conditioning exercises	–	To be able to perform conditioning exercises (e.g., at the gym, home or parks)	To understand how to perform conditioning exercises in different contexts
To incorporate conditioning exercises in the training schedule	–	To be able to incorporate conditioning exercises in a week routine	To understand how to incorporate conditioning exercises in a week routine

[a]When personal determinants of behavioral outcomes are not defined for performance objectives, the sign "–" is presented.

Appendix F

Algorithm to help runners in managing their running volume

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Appendix G

Infographic explaining how runners can manage their running volume