

## **PROSPERO**

### **International prospective register of systematic reviews**

# **The health and well-being benefits of interacting with fish in aquariums: a systematic review**

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### **Citation**

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### **Review question**

What influence does interaction with fish in aquariums have on the psychological well-being of human participants?

What influence does interaction with fish in aquariums have on the physiological well-being of human participants?

### **Searches**

Searches will be conducted in the following electronic databases: CINAHL, Education Source, ERIC, Health Source – Nursing/Academic Edition, MEDLINE, PsycARTICLES, Psychology and Behavioural Sciences Collection, PubMed, SAGE Journals ONLINE, ScienceDirect, and Web of Science. Databases will be searched from inception until the date of searches (January 2018). This will be supplemented by searches in Google Scholar and on the following websites specialising in human-animal interaction: WALTHAM Science ([www.waltham.com](http://www.waltham.com)), HABRI-Central ([www.habricentral.org](http://www.habricentral.org)), and Animals and Society Institute ([www.animalsandsociety.org](http://www.animalsandsociety.org)). The references sections of full-text articles and any relevant review articles identified during the searches will be hand searched for additional primary research.

### **Types of study to be included**

Included studies will be limited to primary research, but there will be no further limitations on the study design. Both quantitative and qualitative research will be included. Research will be limited to that published in peer reviewed journals and doctoral theses.

### **Condition or domain being studied**

Psychological and physiological well-being outcomes.

### **Participants/population**

There will be no limitations on the participants of included studies.

### **Intervention(s), exposure(s)**

Any form of interaction with fish in aquariums will be included, including animal-assisted interventions, lab-based experiments and studies of pet ownership. This will include passive exposure to an aquarium, actively watching fish in an aquarium, and caring for fish in an aquarium. "Non-live" alternatives (e.g. videos of fish swimming displayed on a screen) will also be considered. There will be no limitations on the length, frequency or duration of exposures. Research relating to the health benefits of fish consumption,

studies on well-being benefits of fishing/angling, and any studies involving invasive research conducted on fish will be excluded.

### **Comparator(s)/control**

Studies both with and without a control group will be included. For those with a control group, any type of comparator will be considered, including: no treatment controls, alternative animal-assisted interventions, and alternative interventions without animal involvement.

### **Context**

There will be no limitations on the setting of the research: clinical and laboratory based research will be included. Research relating to large scale public aquariums will also be included, but will be analysed separately from that relating to smaller home aquaria.

### **Primary outcome(s)**

1. Psychological outcomes. Any psychological outcome relevant to well-being such as depression, anxiety, loneliness, health-related behavior change, social interaction. Where multiple measures are used, priority will be given to those measured with validated instruments (e.g. Beck Depression Inventory, State-Trait Anxiety Inventory).

2. Physiological outcomes. Any physiological outcomes relevant to well-being such as blood pressure, heart rate, weight change.

### **Secondary outcome(s)**

1. Attitudes to fish/aquarium based interventions, or pet fish ownership.

2. Adverse effects on human health.

3. Issues regarding animal welfare.

### **Data extraction (selection and coding)**

Study selection: All records identified via electronic databases will be exported into a single EndNote library and duplicates will be removed. All remaining records will then be screened in a two-stage process by two independent reviewers. Initially the title and abstract of all articles will be assessed for relevance, with any disagreements resolved through discussion or by a third reviewer. Next the full-text of all remaining articles will be obtained and screened against the inclusion/exclusion criteria; reasons for exclusion of full text articles will be recorded and any disagreements will be resolved through discussion or by a third reviewer. The reference lists of all included studies will then be screened for additional primary research and the human-animal interaction websites will be searched for additional research.

Data extraction: Data from included studies will be extracted using a purpose-developed data extraction form; this will be completed by two independent reviewers and any disagreements will be resolved through discussion with a third reviewer. The following information will be extracted: general details (author, year, publication type, county, funding and conflicts of interest); study details (aims/objectives, dates of data collection, theoretical framework); methods (study design, recruitment, participant characteristics, intervention, control condition, allocation, setting, primary outcomes (psychological outcomes, physiological outcomes), secondary outcomes (adverse events, animal welfare, attitudes to fish/aquarium based interventions), brief study description); results (analysis, primary outcomes, secondary outcomes); author conclusions; and reviewer comments.

### **Risk of bias (quality) assessment**

Due to the broad inclusion criteria it is likely that included studies will incorporate both quantitative and qualitative research. Therefore, to reflect this variation in study design, quality will be assessed using the National Institute for Health and Care Excellence Quality Appraisal Checklists (2012); checklists are available for intervention studies, quantitative studies reporting a correlation or association, and qualitative studies. Quality assessment will be conducted by two independent reviewers; any disagreements will be resolved through discussion with a third reviewer.

Selective reporting of outcomes will be assessed by comparing the methods section of included studies to the presented results, to identify any discrepancies which occur and assess whether an adequate description of the results is provided. If there is reference made to a published or registered protocol, comparisons will also be drawn between the protocol and published results. Where possible, publication bias will be assessed through identification of asymmetry in funnel plots; however, as this method is not recommended for outcomes with fewer than ten studies it will therefore be utilized only where a sufficient number of studies are identified.

### **Strategy for data synthesis**

Data will be analysed using a narrative synthesis, following the approach outlined by Popay et al. (2006). Initially textual descriptions and tabulation of study data will be used to develop a preliminary synthesis; this will be grouped according to the two primary outcome categories (psychological/physiological). Next relationships in the data will be identified by exploring subgroups and moderator variables. Finally, the robustness of the synthesis will be assessed by examining the quality of included studies (quality appraisals) and assessing the risk of bias (publication bias, selective reporting) across studies.

It is anticipated that there will be too great a level of clinical and methodological heterogeneity between studies for meta-analysis to be appropriate; this will be assessed by comparing participant characteristics, intervention characteristics, measured outcomes, and methodological design across included studies. However, where meta-analytical techniques are deemed appropriate, a random-effects model will be used. This model was chosen over a fixed-effect model as it is typically more conservative and accounts for variation in treatment effects. However, as random-effects models can be influenced by small studies, a fixed effect model will also be used where the presence of small studies is accompanied by evidence of substantial statistical heterogeneity ( $I^2$  50% with a significant  $\chi^2$  statistic).

### **Analysis of subgroups or subsets**

Where the necessary data are available, subgroup analyses will be performed for participant age (child/adult/older adult) and clinical diagnosis; for the type of interaction (passive/active); the setting (public/home aquarium); the presence and type of comparator (no comparator/no treatment control/alternative animal-assisted intervention/other intervention), the length/duration/frequency of exposure; and publication status (published/unpublished).

### **Contact details for further information**

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**Anticipated or actual start date**

24 January 2018

**Anticipated completion date**

01 October 2018

**Funding sources/sponsors**

This systematic review will be conducted as part of the lead author's (HC) PhD which is funded by the University of the West of Scotland and Mars Petcare.

**Conflicts of interest**

This systematic review will be conducted as part of the first author's (HC) Ph.D., which is partially funded by Mars Petcare. Two authors (DS and NG) are employees of the WALTHAM Centre for Pet Nutrition, a Mars Petcare Research Centre. NG provided feedback on earlier drafts of the protocol, but had no input in the decision to fund the Ph.D. Neither author will be involved in study selection, data extraction or analysis but will provide feedback on the completed review before publication.

**Language**

(there is not an English language summary)

**Country**

Scotland, United States of America

**Stage of review**

Review\_Ongoing

**Subject index terms status**

Subject indexing assigned by CRD

**Subject index terms**

Fish; Humans; Stress, Psychological

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**Details of any existing review of the same topic by the same authors****Stage of review at time of this submission**

Stage	Started	Completed
Preliminary searches	Yes	Yes
Piloting of the study selection process	Yes	Yes
Formal screening of search results against eligibility criteria	Yes	No
Data extraction	No	No
Risk of bias (quality) assessment	No	No
Data analysis	No	No

### Versions

09 April 2018

#### PROSPERO

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