**Study Protocol**

**Evaluating Buttabean Motivation (BBM): a community-based, Pacific-driven approach to health.**

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**Title of the study**: Evaluating BBM Motivation: a community-based, Pacific-driven approach to health.

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**Keywords**:

obesity, physical activity, quality of life, weight loss, Pacific Islander, Māori, group model building.

**Abstract**

Introduction

Innovative strategies are critical to address the epidemic of obesity and comorbidities among Pacific and Māori. Buttabean Motivation (BBM) is a Pacific-driven, community-based organisation that aims to address ‘the alarming obesity statistics among Māori and Pasifika’ in Auckland, New Zealand. Transcending western approaches focussing on individual health, BBM promotes a holistic wellbeing approach, by providing a culturally supportive environment to instil healthy lifestyle behaviours for life. Among other activities, BBM also delivers a 6-week programme titled ‘From the Couch’ (FTC) for GP-referred, morbidly obese patients who need support to improve metabolic/cardiovascular health. The aim of this study is to evaluate the effectiveness of the BBM programme for achieving sustained weight loss, reduced obesity-comorbidities, and improved quality of life for attendees. A major objective of this study is to build a detailed program logic model for BBM, to understand its internal dynamics, values, and strengths to inform continuous programme improvement and increase reach and effectiveness. The combination of improved weight and health outcomes, with a corresponding intervention program model would be a valuable template for social services providing healthy lifestyle strategies for indigenous and migrant communities.

Methods and analysis

As this is an evaluation study, purposive sampling of members who attend BBM’s physical activity programmes will be used. There will be two adult cohorts (aged ≥16 years), constituting a General and a Medical programme cohort. The General programme cohort will invite all BBM members (>14,000) who reside in Auckland, and the Medical cohort will be 50 participants from BBM’s FTC programme. The primary outcome measure for both cohorts will be body weight. Secondary outcome measurements will be quality of life and physical activity. Additional outcome measurements for the Medical cohort will be cardiovascular variables (blood pressure, lipids, insulin sensitivity) and diabetes. Total duration of BBM intervention to be assessed will be 24 months, with interim measurements at 6 weeks for the FTC group and then 6, 12 and 24 months for all participants (FTC and General). To build the program logic model, a series of co-design Group Model Building training workshops will be carried out throughout year 1, with two annual reviews.

Main strengths and limitations of this study.

This is the first known evaluation to implement a co-designed, systems dynamics approach of a healthy lifestyle programme for Pacific and Māori communities in New Zealand. For community-based interventions, co-design empowers communities and participants to contribute strengths-based knowledge from a culturally aligned world view into research processes which are often overlooked by researchers. Empowerment is valuable for passive and active sharing of intangible sociocultural factors that feed systems that shape environments, organisations, thought, values, behaviours and health outcomes.

Another strength of this study is that the potential cohort who are considered hard-to-reach are a captured and large audience. They are willing participants in the BBM programme, who have joined to make a change in their health status and lives going forward. Their motivation to engage in research that aims to improve health and wellbeing, has been demonstrated in data collected in a prior investigation ‘Engaging in Buttabean Motivation: a qualitative study’. Combining indigenous cultural frameworks in the delivery of health support services may prove critical for sustained engagement, and significantly improved outcomes for Pacific and Māori populations.

The lack of a comparison group could be viewed as the main weakness of this study. Researchers will use counterfactuals of assumed no weight change (in the absence of a programme) and the outcomes from equivalent programmes from the published literature.

Ethics and dissemination

The Health and Disability Ethics Committee New Zealand has approved the research on [**DATE**].

**Rationale of the study**

Obesity now presents the biggest health risk in Pacific populations. This is well documented and widely accepted. Yet despite community and government efforts to promote weight loss and encourage engagement in lifestyle change programmes, Pacific and Māori continue to have the highest rates in obesity and weight-related disease statistics in Aotearoa compared with their non-Pacific, non-Māori counterparts.[1]

As little as 5% weight loss for a person experiencing obesity, can lead to clinically significant reductions in several weight-related comorbidities [2]. The flow-on benefits of sustained weight loss on other risk factors (e.g. blood pressure, lipids), disease management (e.g. diabetes, sleep apnoea), disease incidence (e.g. diabetes) and even mortality is well established. Too often after initial weight loss success, weight increases return and chronic illnesses persist due to shortcomings of intervention programmes (e.g. short-term, cost, design) and passive over-consumption in an obesogenic food environment.[3] Most existing evaluations of weight loss programmes are researcher-initiated and start with an individualistic base and stringent research design (such as randomised control trials). Biomedically-based interventions are often delivered by ‘experts’ without community leadership and input, and programme life expectancies can end up matching the duration of research grants.

The challenge of creating an effective programme for indigenous and migrant communities, that successfully achieves ongoing engagement and results in sustained weight loss is still to be met. A community wrap around approach is needed to inspire a sense of commitment and sustained motivation.[4] This study will create innovative questions informed by a preliminary study which explores the lived experience of Pacific and Māori clients and trainers using the Fonofale Pacific framework of inquiry.[5] These questions will allow the study to measure underlying sociocultural values that determine sustained motivation, engagement and impact, and how these are associated with biomedical outcomes.

Buttabean Motivation (BBM) [[1]](#footnote-1) is a major Pacific-led organisation of promise that has emerged within this environment. At first glance, BBM is another physical activity programme aimed at addressing ‘the alarming obesity statistics among Māori and Pasifika’ in Aotearoa New Zealand. However, BBM offers a more holistic community-based approach, recognising that cultural factors play an essential and critical role in determining community nutrition and physical activity patterns. Physical activity is important for reducing risk of obesity, cardiovascular disease, stroke, and several other chronic diseases (e.g. type-2 diabetes, hypertension), impacts positively on psychological disorders (depression, anxiety), and overall quality of life.[6] Crucially, physical exercise offers a viable entry point for Pasifika and Māori on the path to wellbeing, with fitness, strength and dance being highly resonant with cultural values and practice. In the context of an obesogenic environment, sociocultural factors (norms, values and beliefs) are important in understanding and mitigating adverse social determinants on health.[7] BBM transcends conventional western definitions and parameters of weight loss programmes, emphasising a Pacific-centric philosophy in relation to family and community, rather than, highlighting individual aims in achieving personal health or a desired body aesthetic. Pacific and Māori cultural values and beliefs are demonstrated in the programme’s wider social support initiatives, such as pop-up health clinics and community education, finding innovative ways to motivate participants to adopt wider lifestyle actions around diet and other health behaviours. This philosophy is also visible in more fundamental forms of social support offered, such as community housing and a food bank, which are well established factors influencing nutrition-related health outcomes. Very few existing weight loss programmes employ a holistic community focussed approach where researchers can be given the opportunity to evaluate this approach in trying to answer important research questions in this context.[8]

Obesity is the consequence of complex, adaptive, societal systems and therefore approaches to deal with obesity (treatment or prevention) need to use systems tools to manage that complexity.[9] There is a lack of evidence implementing systems thinking and analyses to evaluate and assist in the evolution of a community programme delivering health and wellbeing services for Pacific and Māori people that combine culturally appropriate methods of inquiry.[10] The BBM programme presents a unique opportunity to investigate a truly community-owned, socially minded, and culturally centred approach to reducing obesity in NZ Pacific populations. It warrants a full evaluation to not only measure its social and health impacts, but to understand its internal dynamics, values and strengths to inform continuous programme improvement and increase reach and effectiveness.[9]

If the proposed evaluation can produce robust empirical evidence of programme success, it could shift the paradigm for achieving the ultimate public health objective of sustained weight loss in an era of high sedentariness and energy-dense food environment. This paradigm switch, especially for communities with a collectivist culture, may result in a move from the one-on-one advice of expert professionals in a clinic environment to a many-on-many participation with non-experts in community settings. Internationally, it is the collectivist cultures of indigenous and migrant and minority populations, living within dominant individualist western ideologies, which have much greater burdens of obesity.[11] A robust and culturally informed evaluation of BBM, demonstrating the effective features of a successful community-based approach to sustained weight loss, could prove to be of high relevance and benefit to other indigenous and migrant populations. Here in Aotearoa, achieving equity for Pacific and Māori engagement in health enhancing programmes remains an important strategy for achieving better health and wellbeing outcomes, and quality of life for whānau and aiga (Samoan term for family).

The principal study question for this evaluation is, how effective is the BBM program for achieving improved sustained healthy activity and healthy weight metabolic and cardiovascular outcomes, and measurable lifestyle changes for Pacific and Māori members? The main hypothesis is that BBM will create valuable, average sustained weight loss (≥5% of baseline weight) for participants, including measured cardiovascular benefits for GP-referred participants living with morbid obesity. Secondary hypotheses include that programme participation will result in improved outcomes relating to physical activity and eating guidelines; and that BBM members will experience measurable personal and social benefits such as improved health knowledge, quality of life and social relationships.

**Aim and Objectives**

To address these questions, the overarching aim of the proposed study is to evaluate the effectiveness of BBM for sustained health and wellbeing outcomes among its predominantly Pacific and Māori participants. This will be achieved by evaluating three key themes of BBM programme effectiveness: General programme; Medical programme; and Programme process. These themes constitute the three main objectives of the study to assess the General and Medical impact, and Programme values and processes of the BBM system for its members.

The first objective of the study is an impact assessment of BBM’s **General programme** effectiveness. The question is, ‘How effective is BBM in providing sustained weight loss of ≥5% of baseline body weight and improved quality of life measures for its members? For this objective, the goal is to estimate the medium to long-term (1-2y) weight loss maintenance and the impact on quality of life of BBM members across the organisation.

The second objective of the study is an outcome assessment of **Medical programme** effectiveness, to examine the medium to long-term clinical impact on a sub-cohort (n~50) of members who enter BBM morbidly obese, body mass index (BMI) >35kg/m2. For this objective, the question is ‘*How effective is BBM’s From The Couch programme for achieving sustained clinically significant benefits for members with experience of morbid obesity*?’ For this group, as well as data collected in the general survey, detailed medical records will be collected at baseline, six-weeks, and after six, 12, and 24 months.

The third objective, **Programme process** effectiveness, will be a systems analysis (impact logic) of the BBM programme to understand the strengths and challenges of delivering a holistic and sustained service for the community. To address this objective, the question is, ‘*How effective are BBM’s programme processes (inputs-outputs) in achieving its desired outcomes of sustained engagement in programmes, improved knowledge and skills, and changes in health-promoting behaviour*?’ A series of Group Model Building workshops will be carried out with BBM staff to build the systems logic model for the BBM programme. The model will be initiated in year one and be reviewed with annual workshops. It will serve as an agreed theory of change for BBM and help evolve effective programme value by providing the basis for continuous quality improvements. Finally, it will provide a theoretical framework for interpreting the findings of the first two objectives.

**Study design**

This study will use mixed methods to evaluate programme effectiveness of the BBM organisation for adult members (age ≥16 years) over two years. Three key themes will be evaluated for effectiveness: General programme, Medical programme, and Programme process. The General and Medical programme outcome evaluations will be quantitative, cohort surveys and the Programme process evaluation will involve an iterative co-designed systems analysis of the BBM programme using a Fonofale framework of inquiry.[5]

A participatory co-design structure of this research is illustrated in the Figure 1 (below). The lead researcher is the Research Fellow who is supported by the Research Steering Committee (RSC). The RSC enables access to the BBM Governance group. The Research Fellow and the BBM Consumer Advisory Group (CAG) will be a key co-design relationship. The CAG will include staff and members from BBM who will collaborate in the Programme process Group Model Building workshops. They will work together with the RSC to co-create sociocultural questions from themes arising from a preliminary research study ‘Engaging with BBM: a qualitative study’ which commenced in 2020. It explored themes of social motivation, aspiration, and impact among existing BBM participants.

Figure 1. Co-design study structure.



For the General and Medical programme evaluation, participants will be recruited by ‘opting in’ during registration (new members) or through the BBM website (existing members) for up to six months from April 2021. Data will be obtained through BBM’s recently implemented online registration application (the MindBody app) where all new members to BBM must apply to join and to book individual sessions. The app is being continually improved to enable tracking processes, as new and existing members enrol into the system. All registrants (existing and new) who consent will be participants but there will be more complete data for new members such as measured initial weight and quality of life (QoL). Existing members will be given a study tablet and asked to complete the QoL survey online, and physical measurement data will be obtained onsite by trainers. BBM management will advertise the study on their social media platforms and in physical locations (e.g. training centres).

BBM was set up in 2014 and by March 2021 there were over 14,700 members. This equates to over 2,400 annual registrants participating in several programmes including 34 weekly Free Community Bootcamps. When members register to join BBM, data on demographics, health conditions, prescribed medications and reason for joining are routinely collected and this will be made available to the researchers upon participant consent. Additional data (Quality of Life and supplementary health information) will also be collected online after the participant has agreed to be in the study. All data will be requested again at six,12, 24 months. Although weight is recorded routinely at training sessions, BBM staff will undergo training for height and weight measurements using standardised protocols.[12] Programme success for this General group is defined as sustained weight loss at each follow up point compared to counterfactuals of assumed no weight change (in the absence of a programme) and the outcomes from equivalent programmes from the published literature. Before/after changes in quality of life and other self-reported health status will be secondary outcomes.

The Medical programme evaluation will include a sub-sample of (n~50) morbidly obese (body mass index >35) members who enrol in the ‘From the Couch’ (FTC) programme and who consent to participate in the General programme evaluation but will have additional medical assessments. FTC is a six week, highly supportive, holistic, physical activity and tailored diet programme designed for individuals who are usually morbidly obese and have very restricted physical capacity such as not being able to ‘get off the couch or who struggle to stand for very long periods of time’. The aim of the FTC programme is to enable individuals to stand up from a sitting position, and eventually to be able to do everyday activities that most able-bodied people take for granted. In addition to the same information collected in the General programme, participants from FTC will be asked to give consent to use their National Health Identification (NHI) number to access to medical information already collected via TestSafe. These include diagnostic (laboratory) results and reports, clinic letters, eReferrals, pharmacy dispensed medicines, hospital appointments and admissions, and discharge summaries. TestSafe information will be collected at baseline and at 6, 12, and 24 months data points. For each data point, sixth-year Bachelor of Medicine students will be recruited to collect and collate TestSafe data. The counterfactuals for the FTC cohort will be their historical data before entering FTC. Participants will be weighed using Seca Scale Column Model 703 300kg weighing scales without footwear and light clothing only. Programme success for this ‘medical’ group with morbid obesity is greater sustained weight loss than equivalent programmes for this population subgroup, before/after improvements in quality of life, and before/after reductions in medical interventions (e.g. medication use, hospital admissions, primary care visits).

For the Programme process evaluation, a co-created systems analysis logic model will be developed for the BBM programme in year one, followed by a 12-month review, with a final model in year three. To achieve this, BBM trainers will be invited to engage in Group Model Building workshops with the researcher to develop an agreed systems-based logic model (theory of change) for BBM.[13] The model will highlight positive feedback loops on programme quality improvement, BBM trainers’ skills and motivation, and participant knowledge and motivation. Process evaluations include programme inputs (e.g. staff time), processes (e.g. communication), outputs (e.g. immediate member benefits) and short, medium- and long-term impacts (e.g. sustained weight loss, improved health and quality of life). Inquiry will be guided by the Fonofale framework, allowing Pacific knowledge and skills to be represented in a programme model designed for and by Pacific.[5] The model will enable BBM to identify areas for ongoing quality improvement and serve as an agreed theory of change.

Statistical analysis

The primary outcome of interest for the General and Medical programmes is sustained weight loss since it is already well documented that this provides long term health benefits and secondary outcomes include improvement in quality of life scores and social outcomes (e.g. family health). There is no control group but there is very strong evidence that a non-intervention counterfactual of no weight change is plausible since the average natural trajectory of people with obesity is no change or slow increases in weight. A sustained weight loss of 5-10% is clinically meaningful for health benefits, even if people remain overweight or even obese.[2] Participants will be analysed in different groups. The Medical group will be considered as a series of three cohorts of about 20 participants each entering the FTC programme. An estimate of 80% recruitment into the study will give 50 participants who will have baseline and follow up data. The General group will include new entrants who will also form a cohort with baseline and follow up data. These two cohorts will have simple analyses (t-tests for follow up minus baseline data) to define the standard metrics (e.g. mean weight loss, proportion reaching 5% and 10% body weight loss). They will be highly powered (>90%) to detect clinically significant (5%) weight loss at each time point assuming a standard deviation (SD) of 6kg for weight loss taken from meta-analyses such as in Johns, Hartmann-Boyce, Jebb, and Aveyard (2014).[14] The conservative intention-to-treat analyses in weight loss studies use the Baseline Observation Carried Forward for missing data (the assumption of no weight loss for those with no follow up measurements) but this study will be well-powered to account for that.[14]

The General programme will also include analyses of existing BBM participants (>14,000 ever registered) for whom there are not baseline weight measurements. All weight data points for all participants with at least two measurements will be included in repeated measures, mixed models which will then construct the long-term weight loss trajectory profiles of the BBM programme for multiple subgroups. The very large numbers will allow for the creation of robust subgroup profiles.

Estimated duration of the study will be 24 months of follow-up from baseline.

Milestones (all months inclusive)

**Year 1 (Mar 2021-Feb 2022):**

* Mar-May: Ethics application.
* May-Sept: Recruit General and Medical programme participants, acquire routinely collected data, and QoL surveys. Collect TestSafe data for Medical programme.
* Jun-Nov: Group Model Building workshops and develop programme logic model, including follow-up qualitative interviews for programme improvement.
* Nov ’21-Feb ‘22: Data collection for 6-months follow-up.

**Year 2 (Mar 2022-Feb 2023):**

* Mar-Apr: Complete 6-months data collection (March), data cleaning, commence analysis of baseline and 6-months data.
* May-Sep: Data collection for 12-months follow-up; Analysis and report of baseline to 6-months follow-up.
* Sept-Dec: First annual review of programme logic model.
* Oct’22- Feb’23: Analysis and report of baseline to 12-months follow-up.

**Year 3 (Mar 2023-Feb 2024):**

* Mar-May: cont’d Analysis and report of baseline to 12-month follow-up.
* May-Sep: Acquire data for the 24-months follow-up.
* Sep-Dec: Logic model year-2 review.
* Oct’23-Feb’24: Analysis and report of baseline to 24-months follow-up.

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1. The organisation is variably referred to as *BBM*, *BBM Motivation* or *Buttabean Motivation*. Despite the acronym, BBM is not often referred to as *Brown Buttabean Motivation* which originates from the professional pseudonym ‘Brown Buttabean’ used by former boxer and founder of BBM, Dave Letele. [↑](#footnote-ref-1)