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Amalgamation of Marginal Gains (AMG) as a potential system to deliver high-quality fundamental nursing care: A qualitative analysis of interviews from high-performance AMG sports and healthcare practitioners

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Aims and objectives: To investigate the components of the Amalgamation of Marginal Gains (AMG) performance system to identify a set of principles that can be built into an innovative fundamental nursing care protocol.

Background: Nursing is urged to refocus on its fundamental care activities, but little evidence exists to guide practising nurses. Fundamental care is a combination of many small behaviours aimed at meeting a person's care needs. AMG is a successful system of performance management that focusses on small (or marginal) gains, and might provide a new delivery framework for fundamental nursing care.

Design: Qualitative interview study.

Methods: We undertook in-depth interviews with healthcare and sports professionals experienced in AMG. We analysed data using open coding in a framework analysis, and then interrogated the data using Normalisation Process Theory (NPT). We triangulated findings with AMG literature to develop an intervention logic model.

Results: We interviewed 20 AMG practitioners. AMG processes were as follows: focusing on many details to optimise performance, identification of marginal gains using different sources, understanding current versus optimum performance, monitoring at micro and macro level and strong leadership. Elements of normalisation were as follows: whole team belief in AMG to improve performance, a collective desire for excellence using evidence-based actions, whole team engagement to identify choose and implement changes, and individual and group responsibility for monitoring performance.

Conclusions: We have elicited the processes described by AMG innovators in health care and sport and have mapped the normalisation potential and work required to embed such a system into nursing practice.

Relevance to clinical practice: The development of our logic model based on AMG and NPT may provide a practical framework for improving fundamental nursing care and is ripe for further development and testing in clinical trials.

1 | INTRODUCTION

Nursing care matters to people and health services. With life expectancy in many high-income countries such as the UK steadily increasing (Bennett et al., 2015), an increased prevalence of people living with long-term conditions or increased frailty, and only 50% of the population in the UK over 65 years old reporting their health to be "good" or "very good" (Office for National Statistics, 2013), there is great demand for nurses to provide high-quality care. Pressures on care providers have exposed serious flaws in both the organisation and delivery of care by nurses, care that is required when people are unable to meet their own basic needs. These activities by nurses have been described as the "fundamentals of care" (Kitson, Conroy, Wengstrom, Profetto-McGrath, & Robertson-Malt, 2010) and include behaviours such as assisting patients to go to the toilet, to be clean, to be mobile and to eat and drink. When these types of essential nursing care are not attended to, problems for patients are not only unpleasant but can be disastrous, for example, as demonstrated by the Francis and Winterbourne View Reports (Department of Health, 2012, 2013) in the UK, which were both highly critical of the standards of care by nursing staff.

Healthcare agencies and nursing researchers have called for the fundamentals of nursing care to be re-examined in terms of both clinical content and organisational delivery (Department of Health, 2013; Kitson et al., 2010), echoing other recent calls for more robust nursing research evidence to inform practice (Mantzoukas, 2009; Rahm-Hallberg, 2009; Richards, Coulthard, & Borglin, 2014). Indeed, the quantity and standard of research evidence to inform fundamental care nursing practice (Richards, Hilli, Pentecost, Goodwin, & Frost, 2017) remains both scant and of poor quality.

In terms of building an evidence-base for essential nursing care, it is unlikely that focussing research on nursing activities to address just one aspect of care will be particularly helpful. Patients' care needs are complex, personalised and multifacetted. As a consequence, nursing has been described as the "quintessential complex intervention" (Richards & Borglin, 2011) (p 531). For example, maintaining fluid balance requires a nurse to attend to patients' hydration, elimination and mobility needs, underpinned by a focus on effective communication. Omission of any one of these considerations may negate the impact of others—all are necessary and interlinked. Indeed, small deficiencies in essential nursing care are those most noted by patients and relatives (Redfern & Norman, 1999), and inattention to small care matters may compromise patient outcomes (Department of Health, 2013). High-quality care is more likely to be a combination of many small behaviours aimed at meeting a person's care needs (Richards, 2015).

There are parallels in this analysis to the principals of Amalgamation of Marginal Gains (AMG), a performance improvement strategy

What does this paper contribute to the wider global clinical community?

- Amalgamation of Marginal Gains is a system of identification, implementation and combination of small changes that are known components of a high-performance model, used with success in sport and in specific healthcare populations but not to improve fundamental nursing care.
- Small improvements can be made in all fundamental care areas that will impact on the best possible experience for patients.
- AMG process has been mapped and the normalisation potential in practice identified.
- The findings presented in a logic model of AMG in a Normalisation Process Theory framework will form the basis of our ESSENCE nursing intervention to improve the quality of nursing practice.

widely adopted in elite sport to great success. First coined in 1886 by Wilhelm Steinitz (Burgess, 2009), this approach is a methodical system of identifying areas where small improvements could be achieved and then combined to gain advantage. Popularised by Sir Dave Brailsford in the UK, under his leadership British cycling has been transformed to become the most successful Olympic medal winning team at the Rio Olympics 2016 and the comprehensive adoption of AMG in other Olympic sports events was the principle reason why the UK came second in the Olympics medal table. Brailsford, in a television interview explained, "If you broke down everything you could think of that goes into riding a bike, and then improved it by 1%, you will get a significant increase when you put them all together" (Slater, 2012).

Our parallel review of AMG (Wood et al., 2017) shows that AMG is popular as a method of improving health care in areas such as surgery (Fleming et al., 2016), child and family health care (Lemer, Cheung, Klaber, & Hibbs, 2016), and mental health (Nierenberg, Hearing, Mathias, Young, & Sylvia, 2015). However, there is no literature describing AMG processes, no previously published AMG process model and it has not been used in nursing. In a recent editorial, Richards (2015) used his own experience of being nursed after hospitalisation following a myocardial infarction, to draw attention to the similarities between AMG and the small episodes of nursing care that made a difference to his recovery. He called for research into new organisational models of care that would systematically focus

nursing on delivering multiple yet small marginal gains for patients. The study reported here is one-component study in a research programme to assess the impact of an AMG focussed, patient-centred nursing care intervention for patients in hospitals on patient comfort, satisfaction with care, quality of life and costs. It is the first of a series of studies that follows methods advocated by the Medical Research Council's Guidance on research into complex interventions (Craig et al., 2008) to design, test and evaluate an AMG-based fundamental nursing care intervention.

In line with advice in this guidance, at a very early stage in our programme we have also considered the potential "implementability" of any such programme we develop using Normalisation Process Theory (NPT), a social model of healthcare implementation (May & Finch, 2009). NPT is a guiding model for healthcare innovations already used in mental health (Coupe et al., 2014; Knowles et al., 2013) and to develop nursing continence care (French et al., 2016; Thomas et al., 2014). NPT can reduce research waste (Chalmers & Glasziou, 2009) associated with interventions that are unlikely to be successful in practice and encourages researchers to ask a series of questions about potential interventions to check for the presence of essential components of "normalised" (i.e., routine) healthcare practice.

In brief, for a practice to be normalised successfully, four criteria are required to be met (Murray et al., 2010):

- Coherence—sense making, the meaningful qualities of a practice
- Cognitive participation—enrolment and engagement of individuals and groups
- Collective action—work done to enable the intervention to happen
- Reflexive monitoring—formal and informal appraisal of the benefits and costs of the intervention.

In summary therefore as part of our "ESSENCE" (amalgamating marginal gains in ESSEntial Nursing CarE) programme's intervention development phase, we wanted to understand the AMG system and use NPT to develop an intervention logic model for AMG (Kellog Foundation, 2004), paying specific attention to what work would need to be done with elements of AMG to maximise the potential for normalisation in practice. We wanted to analyse the AMG performance improvement procedures used by elite sports teams and healthcare innovators who identify, target and amalgamate areas of potential marginal gains to improve performance, and to investigate whether these processes are likely to be implementable in practice.

2 | METHODS

2.1 | Design

A qualitative interview study using a semi-structured topic guide, initial thematic framework analysis, subsequent triangulation with relevant published papers and secondary theory-driven analysis of the data using NPT.

2.2 | Participants

Study participants were practitioners of AMG in health care and sport. We identified potential participants from reviewing published literature, searching the Internet for media articles, directly approaching organisations and snowballing contacts from recruited participants. We used "Amalgamation of Marginal Gains" and "aggregation of marginal gains" as our search terms. We sent an invitation letter and information sheet to potential participants using publically available contact details. We established eligibility by asking potential participants to confirm that they had experience of implementing an Amalgamation of Marginal Gains approach.

2.3 | Data collection

We summarise our procedures in Figure 1.

We conducted in-depth interviews between April–November 2016 (CP) using a semi-structured topic guide designed by CP, JF and DR and reviewed for coherence and relevance by two patient and public Involvement (PPI) study co-investigators (Figure 1, box 1). We piloted the topic guide (Table 1) with the first four respondents,
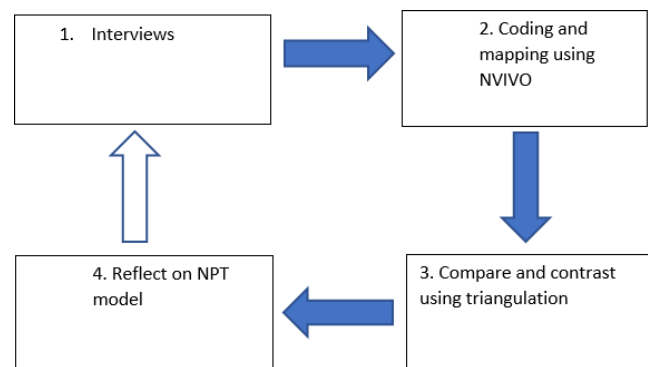

FIGURE 1 Analysis procedure. The unfilled arrow represents the iterative process of returning to the data and earlier stages of analysis

TABLE 1 Interview topic guide main questions

1. What do you understand to be the Amalgamation of Marginal Gains approach?
2. Thinking of an example, what was the overall area of improvement you wanted to achieve?
3. How did you choose what aspects to work on to find marginal gains?
4. Can you give examples of how the chosen areas for improvement were then actioned?
5. How were improvements in chosen areas "amalgamated"?
6. How was change in overall performance recorded or measured?
7. Can you summarise the absolutely key things that were useful to 1. Identifying areas to work on, 2. Making changes, 3. Measuring improvement, 4. Amalgamation?
8. Is there anything important not talked about AMG that you would like to mention?

reviewed it, assessed it as fit for purpose requiring no changes and therefore included these data in our analyses.

We digitally recorded interviews and made field notes to record notes about context and initial thoughts. We sent all interviews to be transcribed verbatim by an independent transcription service, and then, we checked the transcripts against the recordings for accuracy. Prior to interviews, we also identified publically available articles, abstracts or presentations about Amalgamation of Marginal Gains produced by participants, supplemented by any further materials referred to by participants during the interviews, for later triangulation with the interview content.

2.4 | Analysis

2.4.1 | Procedure

We managed the transcripts and field notes using Nvivo 11 data analysis software (QSR International, 2015). Our preliminary coding frame corresponded with the topic guide, and additional codes were developed as the analysis progressed (Figure 1, box 2). Our analysis focused on the identification of examples of actions arising from the implementation of AMG, processes and solutions to problems. The use of Nvivo 11 (QSR International, 2015) allowed us to map each respondent's data, to create a visual display of key examples and processes, and facilitated the identification of "best AMG practice." We highlighted the utility of any examples (e.g., the extent to which the processes and behaviours worked in practice as identified by the respondent) using evaluative coding (Miles, Huberman, & Saldana, 2014). We checked for cognisance and dissonance of AMG processes derived from participant accounts against published AMG literature by participants. We then mapped the relationships between AMG themes and NPT key concepts, assessing the extent to which the concepts of NPT could be discerned from within the AMG examples.

We employed multiple forms of triangulation to add rigour to our analysis (Farmer Robinson, & Elliott, 2006) (Figure 1, box 3). Methodologically, we compared interviews with relevant published studies conducted by the respondents. Substantively, we compared interviews in two areas, health and sport. Theoretically, we worked inductively and deductively, using AMG and NPT frameworks, but also in identifying and evaluating best practice where it occurred, with the two members of the research team (CP, JF) conducting independent analysis, verified by DR.

We report the process by which practitioners have implemented AMG into practice, and we used key NPT concepts to map data on the AMG process against the NPT model (Figure 1, box 4). Questions taken from "Use of NPT in optimising trial parameters" (Murray et al., 2010) were used to help understand the principals of each component and to show where these were supported in the data. Throughout, we present the data where possible using examples from healthcare participants.

We developed an initial draft AMG theory logic model (Kellog Foundation, 2004) after completion of analysis using the main principles of AMG embedded within an NPT framework. We considered the sequence of events reported by participants that brought about the desired change in performance, including the inputs and activities, and the outputs and outcomes (Kellog Foundation, 2004). The model was agreed between researchers, and its potential was verified by an AMG practitioner research team stakeholder. However, the model is only the first iteration and will be developed, changed and validated further during the next phase of our research programme, where we will use consensus development techniques to create an activities approach model based on consultations with nurses and patient and public involvement representatives. Nonetheless, it forms the basis of understanding AMG and the focus of work that would need to be done for it to be normalised in nursing practice.

2.5 | Ethical considerations

We gained ethical approval from the University of Exeter Medical School Research Ethics Committee (Mar16/D/092). All participants provided written informed consent prior to interviewing. Due to the potentially sensitive nature of revealing "marginal gains" advantages to competitors, we provided participants the opportunity to remain personally or organisationally anonymous and for quotes to remain anonymous.

3 | RESULTS

3.1 | Recruited participants

We recruited twenty practitioners of AMG. Thirty healthcare professionals were approached, nine responded, and all nine were recruited. Of the 21 who did not respond, only four were not co-authors or colleagues of interviewees. People recruited were representative of all the areas we found published examples of AMG in health care, namely enhanced recovery (Colorectal, Urology, and Anaesthesia) stroke care, paediatric services and Accident and Emergency. Of the 18 people approached with a sport specific role, eleven responded and all were recruited. Within this sample, we recruited people at different levels of performance including international level, a range of roles within sport teams, and from a variety of team and individual sports. A summary of recruited participant's roles and their AMG objectives are shown in Table 2. The interviews averaged 48 min, ranging from 18–72 minutes.

The initial analysis describes the main principals of AMG, the process of implementing AMG and comparison with NPT theory. The AMG literature confirmed the findings from the interviews, and no new areas of interest were identified. There was evidence to support each of the four components of NPT (coherence, cognitive participation, collection and reflexive monitoring)

TABLE 2 Participant role and AMG application

Health care n = 9				Sport n = 11			
Role	AMG application	Gender male (m) female (f)	ID	Role	AMG application	Gender male (m) female (f)	ID
Consultant anaesthetist	Enhanced recovery following open liver resection—RCT	m	H01	Welsh youth cycling coach and team manager	Qualifying for Olympic team	m	S01
Consultant colorectal surgeon	Enhanced recovery—reduced length of stay	m	H02	British Sailing Association Performance Director	Improving on last Olympic performance	m	S02
Consultant colorectal surgeon	Enhanced recovery, low national mortality rates	m	H03	Chief Executive, Sport Organisation[a]	Improving on last Olympic performance	f	S03
Consultant physician, Regional stroke lead	Top performing stroke department in the country	m	H04	British Swimming, Director of Sport Science and Medicine	Improving on last Olympic performance	m	S04
Consultant physician, Enhanced Recovery NHS England lead	Enhanced recovery—improved patient outcomes, length of stay	m	H05	Hockey performance coach, UoE[b]	Winning British Universities and Colleges league	m	S05
Consultant paediatric physician, allergy	Reduced waiting times, staff morale	f	H06	Strength and Conditioning coach England Centre of Excellence	Premier League standard girls, selection for national squad	m	S06
Consultant paediatric physician	Efficiencies, Staff lunch-breaks	f	H07	British Sailing Association, Head of High Performance and Innovation	Improving on last Olympic performance	m	S07
Charge nurse, Allergy	Patient care "change environment"	m	H08	Olympic swimmer	Peak performance in time for major competition	m	S08
Trust Medical Director	Trust wide AMG application, "A&E floor" efficiencies, staff morale, patient care	m	H09	British Rowing, Senior Sport Scientist	Identifying and testing potential marginal gains, winning	m	S09
				High Performance Manager, UoE[b]	Improved or maintained placings in University leagues	m	S10
				Professional cyclist	Winning for the team, team performance	m	S11

[a]Anonymised.
[b]University of Exeter.

demonstrating that AMG processes could become normalised (Table 3).

Below we summarise the themes relating to AMG from our initial framework analysis and present each component of NPT with core AMG principles against these normalisation concepts with respondent quotes.

3.2 | AMG themes

3.2.1 | Focus on the details

All participants described the key principle of AMG to be implementation of many small and incremental changes over time. Focussing

on all the small details would in turn have a positive influence on overall performance.

3.2.2 | Clear big performance objectives

Participants described the clearly defined and measurable overall outcomes that the whole team and organisation were aligned to. Teams recognised that high-level overall objective was achievable by applying AMG.

3.2.3 | Understanding the performance model

All participants described the complex nature of the high-level outcome they were trying achieve, and so by breaking down and

TABLE 3 NPT components with questions and summary of evidence present

NPT components	Example questions to clarify meaning of component of NPT	Evidence for theory supported in sport (SP) or health care (HC) or none		NPT evaluation summary of evidence
		Yes	No	
Coherence (i.e., meaning and sense making by participants)	Is the intervention easy to describe?	SP&HC		All participants could describe AMG and gave examples of implementation
	Is it clearly distinct from other interventions?	SP&HC		Finding single areas to make big impact was not considered feasible or possible due to complexity
	Does it have a clear purpose for all relevant participants?	SP&HC		Participants and their colleagues strove for clearly defined performance objectives though AMG
	Do participants have a shared sense of its purpose?	SP&HC		Common goals and agreed overall area of improvement
	What benefits will the intervention bring and to whom?	SP&HC		Benefits of achieving the overall objective for patients/athletes, plus organisational and team benefits
	Are these benefits likely to be valued by potential participants?	SP&HC		Marginal gains chosen to have with measurable or perceived outcome benefits for patients/staff/athletes/
	Will it fit with the goals and activities of the organisation?	SP&HC		Overall objectives are decided by senior staff representing the organisation, and marginal gains supported
Cognitive participation (i.e., commitment and engagement by participants)	Are target user groups likely to think that it as a good idea?	SP&HC		Buy in considered key, may not be apparent at start but increases when there is good leadership and benefits are demonstrated
	Will they see the point of the intervention easily?	SP&HC		Different strategies to gain understanding and buy in, top down leadership, bottom up peer-to-peer learning, evidence of successes elsewhere and feedback
	Will they be prepared to invest time, energy and work in it?	SP&HC		Acknowledgement of existing pressure on people's time, but leadership, support and feedback, and building autonomy and ownership, helping participants to see benefits and efficiencies
Collective action (i.e., the work participants do to make the intervention function)	How will the intervention affect the work of user groups?	SP&HC		AMG became the way of doing things. Scope for monitoring and feedback processes to become more aligned to marginal gains targets in HC
	Will it promote or impede their work?	SP&HC	SP&HC	Evidence of concerns about change amongst athletes/staff but also evidence to show how participants have autonomy about how changes are implemented, and marginal gains for efficiencies in practices
	What effect will it have on consultations?	none	none	No specific examples
	Will staff require extensive training before they can use it?	HC		New approaches to changes requires desire to improve leadership and buy in. In sport AMG already embedded, no training required
	How compatible is it with existing work practices?	SP		In sport, practices are embedded and supports desire for competitive advantage. HC examples of a change in "culture" with organisational support. Marginal gains so small changes over time

(Continues)

TABLE 3 (Continued)

NPT components	Example questions to clarify meaning of component of NPT	Evidence for theory supported in sport (SP) or health care (HC) or none		NPT evaluation summary of evidence
		Yes	No	
	What impact will it have on division of labour, resources, power, and responsibility between different professional groups?	none	none	No specific examples of positive or negative impact or resulting conflict between groups
	Will it fit with the overall goals and activity of the organisation?	SP&HC		Organisational goals aligned to chosen "overall objective" are central to AMG
Reflexive monitoring (i.e., participants reflect on or appraise the intervention)	How are users likely to perceive the intervention once it has been in use for a whilst	SP&HC		Positive outcomes recognised as due to team effort to implement changes. Good team morale and pride. Monitoring to maintain focus on current performance model
	Is it likely to be perceived as advantageous for patients and staff?	SP&HC		Importance of monitoring changes and choice of measures to collecting objective and subjective data. Very well done in sport
	Will it be clear what effects the intervention has had?	SP&HC		As above. Review and feedback very well done in sport
	Can users/staff contribute feedback about the intervention once it is in use?	SP&HC		Fewer examples in HC than sport. In sport, review and feedback from athletes as part of implementation of the marginal gains
	Can the intervention be adapted or improved on the basis of experience?	SP&HC		Marginal gains work is based on testing and is flexible depending on successes and current objectives. Changes need to be feasible as well as expected to have an impact on overall outcome

NPT components and questions from Murray et al. (2010).

understanding all possible influences on performance from a variety of sources, areas for marginal gains could be agreed and implemented.

3.2.4 | Understanding current performance

Amalgamation of Marginal Gains practitioners chose areas to work on based on existing performance and comparing this to the ideal performance model. To achieve this, participants drew upon multiple sources of data.

3.2.5 | Monitoring performance and feeding back

Implementation of small changes was monitored and where possible any performance gains were measured, both at the marginal gain level, and at a higher outcome level. Feedback was important to motivate participants in AMG and to identify areas where further enhancements were needed.

3.2.6 | Leadership

All participants understood the importance of leaders that managed the AMG processes by ensuring team working to clear performance

objectives and team focus on working on the chosen marginal gains until they became normalised.

3.3 | NPT components

3.3.1 | Coherence— The meaning of AMG to participants

In terms of NPT's "sense-making" component, both sport and healthcare participants described AMG consistently in simple terms as a method to improve performance in a complex system by making small incremental changes in all possible aspects of performance. Participants believed that by addressing as many of the known components of the intended outcome as possible, the risk of poor performance could be reduced. Participants attempted to work through all the possible influences on performance thoroughly and build on success to optimise the desired outcome.

> *You put them all together, each one of them it has some benefit, you pull them all together you maximise the benefit to patient recovery* (H02)

> *If we do enough of them, hopefully it makes us win more games than we lose* (S04)

Participants recognised the complexity of the main outcome they were trying to achieve and considered that understanding the fine details of the system was worthwhile. Sport participants explained that athletes prepare for competition by applying all of the elements understood to be part of their "performance model" from tactical knowledge, dealing with competition stress, to all elements of fitness and staying hydrated. Both sport and healthcare participants spoke about "working backwards" or "breaking it down" from the outcome of interest to identify all possible elements linked to key known areas. Similarly, in the surgical "enhanced recovery" protocol, twenty-one steps were recognised as key areas that contribute to optimum patient recovery postsurgery, measured by length of stay. Participants found various ways of doing each of these twenty-one procedures well by applying a number of smaller tried and tested well-defined steps to reduce the chance of poor patient outcomes.

> So it's just taking a step back and looking at every contributing factor that goes towards that overall goal. Then you start looking at the side of direct influencing factors. (S02)

> You've then got to describe your pathway and your process and decide what they are. You choose a dozen of the measures that are part of the pathway. (H05)

Clear and agreed overarching objectives were present in all AMG examples given by participants. Often, there was a high-level organisational objective, with team decided subobjectives based upon strengths and weaknesses. In all cases, teams were focussed on marginal gains because they believed them to be aligned to the performance model that linked directly to the overarching high-level objectives.

All participants agreed in the principle that focusing on small elements had an impact on performance as a whole because no one single area was the key to success and identifying big impactful single things was harder to do. However, it was considered important not to lose sight of the obvious and routine elements of the performance model that need to be done well before marginal gains become the focus. This also recognises the possibility of larger gains being possible at the start of the process, when there are more elements of the performance model that are not yet in place.

> Actually very little of significant improvement or change is down to transformational efforts, you know, every now and then you'll have something that does transform a pathway, but it's pretty rare, and it takes a long time to do, so if you're waiting for transformational gains, then you're just gonna see nothing very much happen for a long time. (H09)

> So the reality is that finding those big gains is not a one-off ticket item, its multiple items added together that gives you that gain effectively. (S02)

3.3.2 | Cognitive participation— Understanding the current position against known elements of best performance and the desire for improvement

In terms of NPT's "engagement'" component, all participants demonstrated a strong commitment to work towards specific high-performance objectives. This was a central component of AMG and implementation success. Wanting to be the "winner," or to provide the "best possible care" with clearly defined outcome goals was shared between the organisation and the teams who were working on "marginal gains." A team approach to the overarching goal was believed by participants to be strong indicator of successful performance.

> You want everyone to sing from the same hymn sheet. (H01)

> So there is a kind of collective attitude that you all want to get better. (S08)

Team working under good leadership strengthened people's feelings of team cohesion by working towards a common goal. Participants from both sport and health care considered that they were delivering consistent high-quality performance because they were attending to the important details that make up the best possible performance. The commitment to working on marginal gains was built on the belief that the AMG approach not only would improve overall performance, but the changes would be worthwhile on many levels. In health care, meaningful benefits of improved performance were reported at a personal, patient, ward and organisational level, and in sport, meaningful benefits were also described on an athlete level, for the team, and for the sport. These benefits were attributed to the dedicated belief in the importance of attending to the details. Having clear overarching performance objectives alongside understanding components of the performance model allowed participants to see that improvements could be made.

Measuring performance at all levels of the performance model allowed team members to see where their strengths and weaknesses were, so areas for improvement could be identified. The view of current practice not being perfect was a central belief amongst all participants. This attitude was described by participants as being central to their own beliefs, and was believed to be the attitude of their teams.

> We should always look at ways of making things better and changing (H07)

> The first step is the most important, showing people where they are, so whatever you decide your improvement area is, you've got to say 'You might be interested in this. We've looked across England, or across the wards in [name of county] and it appears as if, you know, you are somewhere over here, does that feel about right?' (H05)

3.3.3 | Collective Action— Working as a team towards AMG objectives

In terms of NPT's "work done" component, a belief in the vision of the overall objectives, the process and the marginal gains to achieve success were linked to the subsequent actions to make AMG happen. Bringing people together as a team to have an input into the decisions about how AMG was delivered focussed subsequent efforts to implement it. Several healthcare examples involved the whole team making suggestions and having an input in the decision of the types of changes that were made. Several healthcare respondents mentioned the use of regular staff meetings including staff with different roles, perspectives and levels of experience to discuss potential areas for improvement. One team also invited all potential relevant stakeholders at the start of an initiative to improve performance, to highlight the things that they thought needed improving. Whilst not being specific performance improvement actions, these are all examples of collective action towards the goal of performance improvement.

> Staff report enhanced morale and unexpected gains from collaboration with other stakeholders, including mutual identification of opportunities for further service improvements. (H07) (Eisen et al., 2014)

In both sport and health care, identification of candidate areas for change was identified through input from team members as well as looking for innovative ideas from people with experience outside the team. In sport, ideas came via the team reviewing evidence from other winning teams within the same sport, from people in other disciplines and from other sports. In health care, identification of areas to work on was more typically from individual members of the team, from patient feedback and from published evidence.

> All the staff come together, there's improvement tickets so anybody can write about a problem and what they think the solution is, and the Improvement Huddle function is to discuss that, prioritise it and agree whether it's something that they need to work on just now, or not. (H09)

There were several descriptions of scoping exercises being carried out to test and evaluate the risk and benefit for implementing new ideas to make marginal gains. The information was used to plan further action to apply changes after other members of the team accepted this data. In health care, nurses were encouraged to come forward with ideas. People with promising ideas for changes were allowed time to work up and test the idea and if successful were responsible for training other staff members. The information gathered was important to provide evidence that could help secure investment in time and resources to make and evaluate change. In sport, athletes and senior performance directors needed to be confident that any changes would be worthwhile and especially would

not hinder performance. In health care, the team and organisation priorities were often around improved performance alongside minimal cost and ease of adoption. Many of the marginal gains chosen were aligned to making cost and time savings and improving efficiency of existing procedures. Changes that had a direct positive impact on working practices were attractive to staff and where these could be highlighted it was easier to empower staff to make changes.

> When you're establishing which ones you're going to invest in and which ones you're not going to invest in, the first thing to do is to activate a small scoping project to identify the cost, you know, is it realistic, is that targeted outcome achievable? What additional resources would be required? And are the − is the skill set available to help achieve that? (S07)

The action required to achieve the small improvements in performance was assisted by the perception of it being feasible. By its definition, AMG is about improving performance through making small changes. Participants explained that changes were made over time. Words to describe implementation of AMG included "incremental" and "additive" indicating that amalgamation is ongoing and gradual. This was considered to ease the burden to avoid overwhelming the people making the changes. It was also preferable to making big changes suddenly, which was thought to be not only more difficult to do, but more difficult to identify big winning changes. AMG was managed by restricting the number of changes at any one time. Changes were implemented until they were established as routine, and then, new ones were considered.

> You can make small changes gradually as you go along. And I think it helps staff get used to working in a change environment and it also gets you where you need to go without causing them too much stress. (H08)

> We keep it focused to a limited number of things that you're working on, on the basis that if you're trying to improve everything you'll probably improve nothing. (H09)

These action strategies were managed by good leaders with credibility to empower their teams. Leaders ensured that the agreed objectives remained a focus when working on marginal gains. In all cases, participants considered good leadership to be an important factor to achieving performance at a high level. Those who were leaders saw themselves as having a strong vision and focussed on attending to the meaningful details to deliver the necessary high-quality performance. Their leadership was essential to ensure team members were aware when changes had been successful. For health care, the desired positive outcomes for teams included patient outcomes and staff work environment. Leaders were empathetic and

recognised the value of providing the right environment for staff and athletes to feel "valued and useful" with "opportunities to progress and learn" (H03). Sports leaders spoke about coaches being "expert questioners" rather than being autocratic. Athletes were encouraged to assess their own performance and to try out solutions to issues to allow athletes to learn and develop. Athletes were taught to be independent, in that expert advice and support was only made available when issues were detected during the review process.

Leaders implemented "peer-to-peer" learning as a strategy to deliver changes in both sport and health care. Leaders supported team members to lead their own working groups on marginal gains, selecting people to do so who were influential. This helped to develop confidence and encouraged ownership of change and team cohesion. In sport, coaches encouraged team members to consider their own performance in the context of the team to encourage members to have responsibility to other team members to perform and to work collectively. (S02, S03)

> *We need someone in that team who leads and who can influence and support the staff. And often it's just like giving people confidence, not about beating them with a stick, it's just about – it's OK to do it this way.* (H05)

3.3.4 | Reflexive monitoring— Reviewing performance and feedback

In terms of NPT's "appraisal" component, measuring the current processes, procedures and outcomes provided information to inform a strategy to improve performance. Seeing where improvements were realised had an impact in sustainable engagement in the AMG process. Both sport and healthcare participants provided examples of measurement and monitoring within a structured review process. Continuous performance monitoring was a central part of the sporting world and helped to keep athletes focussed on the marginal gains they were trying to achieve. Athletes had responsibility for self-monitoring their progress in the elements they were working on, from their food intake, the quality of their rest and the various elements in their physical training. Athletes knew exactly what they should be achieving and what they were trying to improve at any particular phase of their training. The coaches and team managers monitored how the team or individual athletes were progressing towards the overall objective and were there to identify when there were issues or problems. Additional support from relevant experts was quickly identified and provided.

> *They don't go into these quarterly reviews being told, they go into the quarterly reviews having to tell the coaches what they think.* (S03)

In other healthcare examples, the known aspects of treatment and care to optimise patient outcomes were protocoled and carefully monitored using audits to ensure fidelity or to identify where there

was a problem with performance standards. Careful monitoring of performance helped to keep the ward focussed on the specific areas of improvement.

Reviewing progress also allowed information to be fed back to team members and the wider organisation on the impact and effect of changes. In sport, athletes were taught to understand their own performance instantly, through objective and subjective measures, or through regular testing. Athletes were familiar with frequent review meetings with coaches to look at the marginal gains being addressed, and less frequent meetings to discuss overall performance towards long-term objectives with team directors. In health care, there were different approaches to monitoring and feedback. Although regular meetings to review progress were also a feature of some of the healthcare examples, when the review process was infrequent, such as only following an annual national audit there were more difficulties in staff engagement to maintain focus on marginal gains. Regular review and feedback reinforced the team working towards focussed objectives. In the regular review meetings, progress towards the selected changes was presented using data collected, and the direction of the efforts for the following period until the next meeting were decided. Attendees were often representatives of smaller groups within the team. Those attending the meeting fed information back at ward level. Review meetings could be frequent and ranged from once a week, twice a month to once a month and were often only relatively short in duration. Participants spoke of the importance of monitoring and feedback and its influence on good team morale.

> *The whole goal was to make it easier for everyone, and you know it is quite, when the whole game is to make sure you get a lunch break, you know, it's quite motivating I suppose!* (H06)

> *When they adopt a programme like this, it's not like other things you do in the NHS, when you start doing this things get better, patients look better, your outcomes improve and actually that drives about everyone, then people are very engaged.* (H05)

3.4 | The logic model

Using the data presented in the previous sections, we produced a logic model (Kellog Foundation, 2004) to highlight the key AMG processes and facilitators that allowed sustainable implementation in our data and mapped these to NPT components (Figure 2).

This model highlights the fluid interplay of each NPT component and the detailed AMG elements for each stage. First, the AMG model has to make sense and our data suggest that in both sport and healthcare improvement, it does indeed have potential coherence. This is mainly though AMG defining an overall performance model and specifying the component steps required going backwards from
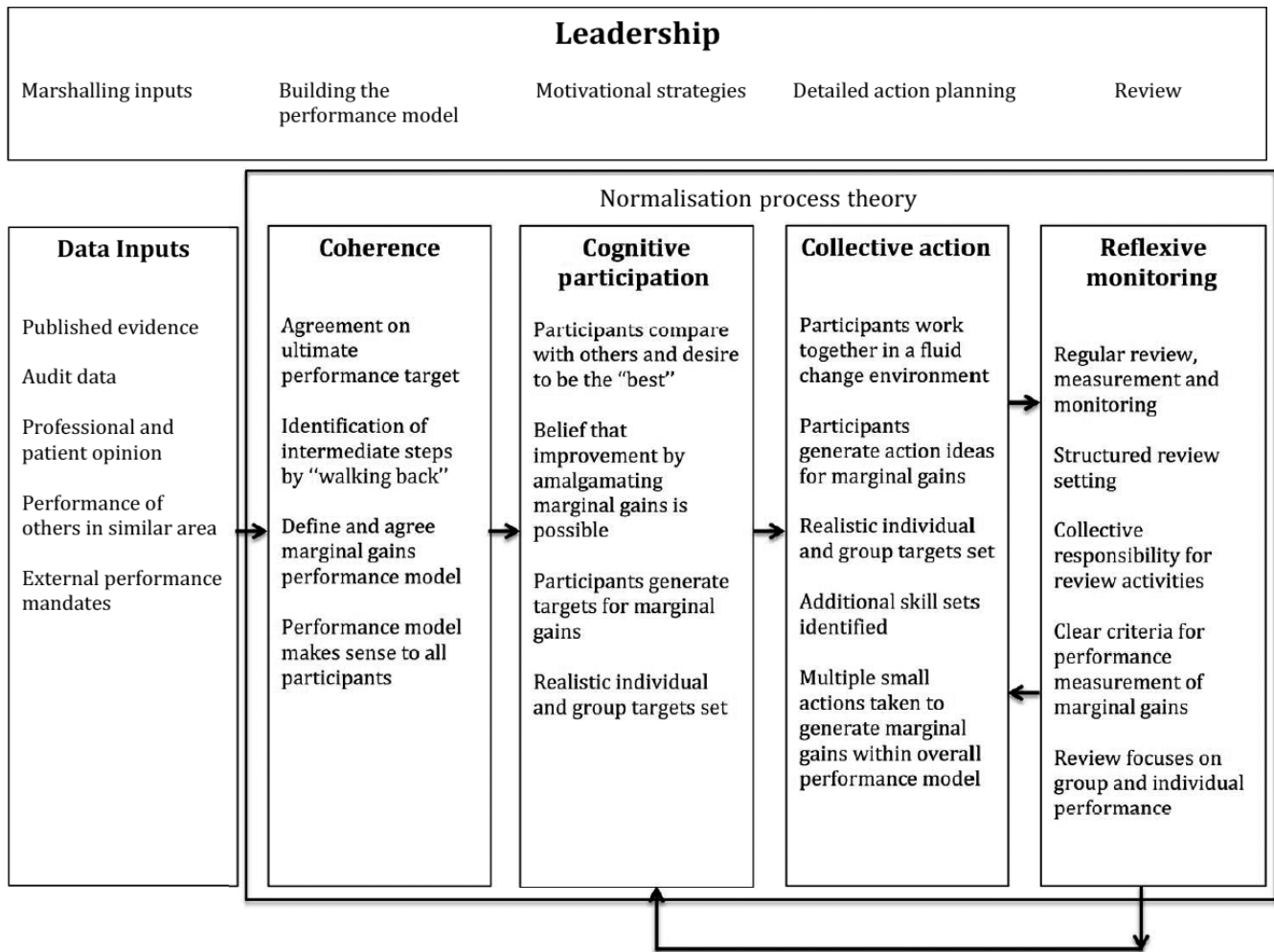
Leadership

| Marshalling inputs | Building the performance model | Motivational strategies | Detailed action planning | Review |

Normalisation process theory

Data Inputs	**Coherence**	**Cognitive participation**	**Collective action**	**Reflexive monitoring**
Published evidence	Agreement on ultimate performance target	Participants compare with others and desire to be the "best"	Participants work together in a fluid change environment	Regular review, measurement and monitoring
Audit data	Identification of intermediate steps by "walking back"	Belief that improvement by amalgamating marginal gains is possible	Participants generate action ideas for marginal gains	Structured review setting
Professional and patient opinion	Define and agree marginal gains performance model	Participants generate targets for marginal gains	Realistic individual and group targets set	Collective responsibility for review activities
Performance of others in similar area	Performance model makes sense to all participants	Realistic individual and group targets set	Additional skill sets identified	Clear criteria for performance measurement of marginal gains
External performance mandates			Multiple small actions taken to generate marginal gains within overall performance model	Review focuses on group and individual performance

FIGURE 2 AMG logic model. The key factors present in a successful application of AMG were as follows: Collection of information from a variety of sources to identify elements and marginal gains that impact on overall performance—the performance model; Agreed overall performance target and collective understanding of the elements of the "best possible performance"; A collective and individual desire to be the best with the belief that working on the details of the performance model will achieve this; Teams working on generating and testing ideas for marginal gains and implementation strategies aligned to performance targets; Individual and group performance monitoring and review of marginal gains implementation and outcomes; Leadership and organisational support to identify implement and monitor changes and feedback changes

the identified performance goal in a way that will make sense to participants. However, in order to be translated into action, individuals and teams need to internalise the model into their own sense of their working lives. To do this requires them to compare their performance with others and believe that improvement by amalgamating marginal gains is possible as part of an overall desire to be the best. Participants generate their own ideas for marginal gains and are involved in setting their own targets in line with chosen priorities.

Translating these ideas into action requires participants to work together on these targets in a fluid change environment, generating action ideas for marginal gains, setting realistic individual and group targets and taking multiple small actions to generate marginal gains within the overall performance model. Participants may also need to identify and develop additional skill sets to do so.

Regular review, measurement and monitoring in a structured setting where participants take collective responsibility for review activities are an essential part of the AMG model. Participants have clear criteria for performance measurement of marginal gains where review focuses on highly specific and overall group and individual performance.

Two other components influence the implementability of the AMG model: data inputs and leadership. Initial data inputs into the model provide participants with the impetus to establish the status of their current performance. These inputs are very diverse and range from an appreciation of the performance of others in similar areas, published evidence, local audit data, professional and patient opinion, and external mandates to change practice. Overlaying the model is a clear emphasis on leadership. Specific leadership actions are dependent on the implementation phase in the NPT model and include marshalling the data inputs, building the performance model, motivating individuals and the team, planning detailed action and leading reviews of performance.

Finally, fluidity is key. For example, reflexive monitoring is used in both macro- and microterms. It provides feedback on specific collective action towards a marginal gain, leading to continuation or change in the actions. It is also used to look at the amalgamation of these marginal gains in terms of the overall performance outcome. Reflexive monitoring can also directly increase cognitive participation in both specific marginal gains actions and the AMG model in general.

4 | DISCUSSION

We have identified the core elements of the AMG performance model as: having a clear performance goal and a whole team desire to be the best; a defined performance model based on the understanding of influences by working back from the main objective and reviewing multiple sources of evidence; understanding current performance against others delivering high performance; team working to identify priorities and strategies for implementing small changes; regular performance monitoring at individual and group level and at marginal gains and overall performance level; and leadership to lead a cohesive team aligned to the AMG approach and to manage monitoring and feedback.

Given that there exists some lack of clarity over both the term "fundamental care" and who should deliver it, one of the core components of AMG—team working to identify priorities and strategies for implementing small changes—may be particularly useful, facilitating all members of a nursing team working together to define the main objective of fundamental nursing care, for example delivering consistently high patient experience of care. If this is the agreed overarching goal, the key factors that contribute to high-quality experience of care (the performance model) can then be identified based on information from various stakeholders (collective action) such as patients and members of the care team. The AMG model allows areas where improvements can be made to be chosen by the team, informed by current performance, and potential marginal gains identified. Teams can then work together on implementing a small number of agreed marginal gain areas. Marginal gains can be measured via routine record keeping or bespoke feedback mechanisms.

In our AMG conceptual and logic model, the leader acts as a facilitator to generate interest in making changes to improve care, to empower nurses' identification of areas for improvement, to encourage teams to problem solve methods of implementation, and to facilitate effective monitoring and feedback around marginal gains and overarching outcomes. Although the most suitable leader may be a registered nurse or a ward leader, it is possible that both leadership and specific roles regarding implementation of marginal gains might be delegated to others within the team.

We have also mapped the identified core elements of AMG against the four NPT concepts to provide a useful logic model by which the processes of AMG can be structured and optimised for implementation in quality improvement and performance enhancement initiatives. This gives us some confidence that we will be able to design and incorporate AMG into a system of fundamental nursing care practice, using NPT as our implementation framework. The NPT concepts for AMG are as follows:

1. Coherence—a defined overall performance model specifying the complex component steps required towards meeting the identified performance goal in a way that will make sense to participants.
2. Cognitive participation—individual and team sense making to buy into the AMG model as part of an overall desire to be the best, involving teams and individuals in generating their own ideas for marginal gains and setting their own targets, in order to believe that applying the model will improve their overall performance.
3. Collective action—participants working together to set individual and group targets, taking multiple small actions to deliver marginal gains within the overall performance model, sometimes also developing additional skill sets to do so.
4. Reflexive monitoring—participants taking collective responsibility for measurement and monitoring of processes and outcomes in a structured and regular manner, and feeding back details against clear criteria for performance measurement of marginal gains and overall performance.

Clear leadership, using different skills against different staged objectives, and data inputs complete our logic model.

As noted earlier, one of the important roles of a leader is to facilitate nurses receiving feedback on the marginal gains strategies applied. Although routinely collected ward data may offer useful feedback, other measures linked to positive patient experiences and outcomes may need to be collected specifically to measure the impact of AMG. These could be in the form of highly specific measures (e.g.,, calorie intake if nutrition was a focus of AMG action) and patient-centred measures of satisfaction (e.g.,, the timing and types of food offered). The purpose of feedback data collected should be to reinforce nursing behaviours in nurses themselves, and to develop knowledge (reflexive monitoring) on successful strategies for the delivery of marginal gains linked to the overall performance model.

We found that sport and healthcare professionals understood AMG in similar ways. Participants believed that by perfecting the many small elements of a complex system, high-level performance could be achieved. They regarded this as preferable to trying to identify and implement big changes that were potentially more difficult to identify and implement. Participants' shared sense of purpose towards the overarching objectives was assisted by their belief in the feasibility of achieving excellence.

That the AMG process focuses on making small incremental changes, encouraging input from team members, facilitates buy in (cognitive participation) and commitment to making changes (collective action). The healthcare informants reported good team cohesion and morale from this process, which they attributed to a collective

attitude to performance excellence and attending to the details. It was important that staff implementing changes saw change as necessary, and to believe that there would be a benefit. In some elite Olympic teams, potential new gains were thoroughly tested to generate evidence that they would work, and were also assessed for cost/benefit before being implemented. In health care, marginal gains were often aspects that were easy or quick to implement, but in some cases, a detailed scoping exercise would also be necessary to minimise the risk of marginal changes not working or being too resource intensive.

Strong leadership was evident, encouraging teams to be vigilant in identifying possible marginal gains and encouraging them in the necessary work required to implement and monitor changes. In the AMG examples provided by our participants, leaders clearly encouraged team working (collective action). All team members' ideas were considered useful independent of their knowledge or experience, and team members were encouraged to continually seek places where marginal gains could be made. Team members and organisational leaders reported being comfortable about applying varied strategies for achieving marginal gains when they considered them useful and feasible, and they described an openness to learning from others and trying things out on a smaller scale before wider implementation. In AMG systems, team members were kept informed of progress through regular meetings (reflexive monitoring), which helped to maintain commitment to the overarching objectives.

It appears likely from our data that a strong leader is required to facilitate the implementation of AMG. In sport, there were people dedicated to this role. Respondent leaders in our study reported being trusted and supported by staff, and reported their teams being dedicated to the pursuit of common shared goals (cognitive participation). Leaders reported ensuring procedures and outcomes were monitored and fed back to those making the changes (reflexive monitoring). All participants gave examples of their increased confidence in AMG as more marginal gains were implemented and benefits seen in performance outcomes. In sport, this was done at an individual level, with athletes monitoring their own progress, but it was less clear whether this was the case in health care. Although healthcare staff had awareness of improvements to working practice, there may be scope for individual performance monitoring to strengthen further the belief in the method and engagement with implementing marginal gains (cognitive participation and collective action). Nonpatient benefits did not appear to be purposefully measured (such as team working, staff morale, pride and empowerment) but were reported by participants as important variables mediating performance outcomes of the AMG strategy. We need to ensure that these factors are built into the NPT concept of reflexive monitoring. Recent reports have highlighted the problem of low staff morale and high turnover in some UK hospitals due to stress (Health Education England, 2014; Staff Survey Co-ordination centre, 2016). This is not a problem unique to the UK (Aiken et al., 2012). Our AMG model may help to enhance morale and team working not only in the UK but elsewhere.

4.1 | Strengths and limitations

Our sample provided a wide variety of AMG examples from participants at the very top of sporting success in the UK, and in health care but we did not find any nursing care AMG examples. However, several of the healthcare participants worked with nursing staff who were responsible for implementing marginal gains to influence the overall service improvement objectives. In enhanced recovery for example, much emphasis was placed on optimising elements of patient recovery, including returning to normal eating and early mobilisation, and the charge nurse participant spoke about supporting his team of nurses to implement marginal gains and encouraging team working to test new ideas.

Using a convenience sampling method, we approached as many people as possible who publicised their use of AMG. However, it is possible that we may have missed other practitioners of AMG implementation because other quality improvement initiatives are using similar procedures but do not call themselves AMG. Our strength is that we were clearly focussed on people who were following an AMG model by their own admission with clearly defined AMG procedures. Although we were unable to verify findings with our AMG participants, we rigorously checked for cognisance and dissonance of AMG processes derived from participant accounts against published AMG literature by participants.

Other quality improvement systems, for example the Plan Do Study Act cycle (PDSA or Deming Cycle) (Deming, 1986), the work of Donald Berwick (Berwick, 1989) and the Institute for Healthcare Improvement (http://www.ihi.org/), and the Chartered Quality Institute (https://www.quality.org/) have been suggested as a means to improve healthcare delivery. However, our purpose in this study was not to compare and contrast these systems but to examine the components of AMG that have made it successful when implemented elsewhere than nursing. There is considerable evidence that AMG consistently delivers significant performance improvements in elite sports (Slater, 2012) and may also do so in other healthcare environments (Paton et al., 2014). AMG is not prescriptive but is flexible and can be tailored to the needs of the individual and the context in a system that allows for learning and continual improvement. AMG specifically focusses on the identification of the small components within an overall evidence-based performance model. Although it may share superficial similarities to other systems, we consider that it is sufficiently unique to warrant further study and application outside of sports and the few specific healthcare domains where it has been tried previously.

Normalisation Process Theory is one of several potential implementation models that we could have chosen. Our overarching objective is to develop an AMG nursing intervention that can be adopted by the National Health Service (NHS). As NPT has already been used to optimise Health Service interventions, it was considered useful at this early stage to identify potential difficulties in implementation. This study illustrates one element of the rigorous optimisation of a complex intervention to improve nursing care. In the next stage of intervention development, we will consider other

evidence-based implementation models, such as behaviour change techniques to further refine the logic model.

4.2 | Implications

Patients often report positive experiences of fundamental nursing care, but the quality of care is not consistent (Aiken et al., 2012). The things that patients notice that are attended to or missed when being cared for by nurses are small but fundamental things (Department of Health, 2012, 2013). Building up a knowledge base of all the possible small aspects of fundamental nursing behaviours that optimise patient's experience of care in areas such as ensuring adequate mobility, hygiene, nutrition and toileting needs, and working towards implementing each of them could reduce missed care and more aspects of excellent care will become normalised. AMG is a philosophy of performance improvement that until now no one has described its implementation procedures in detail. If this innovative model for fundamental nursing care can be successfully implemented in nursing practice to identify, implement, monitor and normalise the small elements comprising the fundamentals of care that are important to patients there are implications for the improvement of nursing care quality, and better experience and outcomes for patients.

The implications for nursing of this work are several folds. First, we have developed a logic model and implementation framework to maximise the potential for AMG in fundamental nursing care. However, the model currently lacks specific nursing input focus. It may be a challenge for nursing to shift to this model. There would need to be strong organisational level "buy in" to allow for the system changes and the necessary monitoring to demonstrate benefits and reinforce behaviour. Therefore, as the next phase of our programme, we will conduct further research with patients and nurses to develop a consensus definition on the structure, operation and content of AMG for nursing. We will then test AMG in a trial of fundamental nursing care organised using AMG principles. Second, inputting into this consensus work will be the identification of potential candidates for marginal gains in the "nursing performance model" based upon evidence from a systematic review (Richards et al., 2017) and a narrative qualitative synthesis of nurse and patient experience of nursing care (Pentecost, Frost, Hilli, Goodwin, & Richards, 2017). Third, we need to identify and review potential measures of change to inform the reflexive monitoring element of the model at both the overarching level and at the "marginal gains" level. These new elements will be added to the logic model and then tested empirically in multisite cluster randomised controlled trial.

5 | CONCLUSION

The Amalgamation of Marginal Gains is a system that identifies, implements and combines small changes in practice to enhance performance, been effective in sport and has been tried in health care but not nursing. We undertook this study to begin a process to improve the quality of research that could inform nursing practice in the fundamentals of care. We have elicited the processes described by AMG innovators in health care and sport in the UK and have mapped the normalisation potential and work to be done to embed such a system into nursing practice itself. We have mapped the processes of AMG for their potential in nursing practice using Normalisation Process Theory, all four components of which have been identified and required actions highlighted, demonstrating that AMG could be optimised for implementation using NPT. We have incorporated a logic model of AMG into an NPT framework that will be the basis of our future "ESSENCE" nursing intervention. The model indicates that AMG could be the basis for improving performance when there is an organisational desire for change with a strong leader and monitoring and feedback of performance benefits for sustainability of improvements. We will now undertake further optimisation and empirical evaluation of an AMG logic model for nursing intervention focussing on fundamental nursing care.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interests.

CONTRIBUTIONS

Study design: DAR, JF, CP; data collection and analysis: CP, JF, DAR and manuscript preparation: CP, JR, DAR.

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