Evaluating the Impact of COVID-19 on the Macmillan Move More Service for Northern Ireland: Results from an Exploratory Survey

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Abstract

Purpose

The recent coronavirus pandemic (COVID-19) and societal restrictions have altered the delivery of routine cancer care and supportive services. The Macmillan Move More Northern Ireland (MMNI) programme provides support to people affected by cancer and access to physical activity opportunities and behavioural change support before, during and after treatment. This service evaluation aims to provide an account of the impact of the pandemic on the MMNI participants and identify potential methods to develop and adapt service delivery.

Methods

A multiple-choice and short answer online survey was sent to 730 MMNI participants (over 18 years of age; received a diagnosis of cancer). The purpose of the survey was to investigate the impact of the initial, national COVID-19 lockdown. Specifically, the survey examined physical activity patterns, the physical / emotional / social impact of restrictions and attitudes towards digitally supported exercise. Some participants opted to complete telephone consultations, to maximise uptake. Free text responses were analysed thematically with findings verified and discussed within the research team.

Results

377 participants completed the survey (52% response rate). 50% of respondents received a diagnosis of breast cancer, with the remainder of the sample comprised of 36 other diagnoses (82% of respondents were female). Service users widely praised the MMNI response to the pandemic in free text responses. Participants reported physical activity levels decreased during COVID-19 restrictions, citing isolation; declining health / fitness; lack of access / provision and decreased motivation as reasons. The dataset trended towards women and those with a diagnosis of breast cancer, given their representation. Seventy-one percent of respondents reported the pandemic had impacted their physical (n = 119) and / or psychosocial (n = 231) wellbeing. The majority of respondents were availing of digitally supported exercise to maintain contact with the service, whilst nearly half of males sampled do not currently engage digitally (46%). Finally, 80% of respondents indicated that they would be interested in using a MMNI smart application to participate.

Conclusion

The COVID-19 pandemic and associated restrictions have impacted the physical activity levels of MMNI service users. Supervised MMNI classes were the most popular mode of activity (pre-pandemic) but enforced leisure centre closures perhaps prompted the observed reduction. The pandemic has negatively affected the psychosocial wellbeing (mental health) of participants, compounded by the restrictions imposed on the traditional delivery of MMNI. This impact is felt equally across cancer types. Digitally supported exercise can facilitate remote, supervised exercise classes and overcome some of the issues presented. Participants with breast cancer (61%) are the most engaged in using digital technology to access exercise (then colorectal [59%] and prostate [54%]). Although underrepresented, men require greater targeting to ensure equality in access to online services. As COVID-19 restrictions are being implemented globally, this evaluation may help guide service innovation for similar programmes.

Keywords

COVID-19 • Cancer • Macmillan Move More NI • Physical activity • Service evaluation.

Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the viral strain responsible for the novel 2019 coronavirus (COVID-19) pandemic. Since its emergence in Wuhan City (Hubei Province, China) in December 2019, the virus has subsequently swept across the globe with the World Health Organisation (WHO) declaring the outbreak a public health emergency. COVID-19 is associated with lethal respiratory infections in humans and appears to affect people of all ages; however, older adults and those with comorbid medical conditions are at higher risk of severe medical complications [1]. The virus is primarily spread through direct (person to person) or indirect (surfaces) contact transmission via respiratory secretions, which can infect an individual by entering their mouth, nose or eyes [2].

As of 22nd November 2020, there has been 1.51 million confirmed cases in the UK (49,784 in Northern Ireland) with ~ 55,000 deaths [3]. The UK government has responded to the surge in cases (presently a secondary wave) by implementing widespread transmission prevention measures. To date, without an effective vaccine, physical distancing used alongside good personal hygiene (hand hygiene, face coverings etc) appear to be the most effective measures to limit the spread of the virus [4, 5]. The UK entered a national lockdown in March 2020 to control the spread of the virus and in recent months restrictions have been gradually relaxed and been implemented again (October 2020). However, the measures introduced to contain the virus have severely impacted the provision of clinical services including routine cancer care and supportive services (e.g. allied health and supportive care interventions) [6], normally relied upon by individuals living with and beyond cancer. In fact, the extent of the pandemic has created a backlog of 50,000 undiagnosed cases, that even significant extra resources will take approximately 20 months to rectify, with additional surges extending this timeline further [7].

Each year, over 360,000 (>9,400 in Northern Ireland) new cancer diagnoses are reported in the UK, with numbers estimated to increase by 2% by 2035 [8]. With increasing numbers of cancer survivors, effective supportive care interventions are required. Accumulating evidence recognises regular exercise as an effective supportive care intervention which can induce many physiological and psychosocial benefits. These include improved tolerance to cancer treatment-related toxicities, improved disease outcomes and better quality of life throughout survivorship [9]. Exercise training has been shown to improve cardiorespiratory fitness,

muscular strength, body composition, fatigue and overall quality of life in individuals with cancer before, during and following treatment, with supervised exercise preferred due to larger improvements than self-directed exercise [9, 10]. However, the restrictions imposed in response to the COVID-19 pandemic prevents the delivery of face-to-face exercise sessions. In response, exercise providers have been forced to innovate using digital technology to provide individuals with cancer access to exercise programmes [6], whilst service users have had to embrace these technological innovations to stay active.

Macmillan Move More NI (MMNI) is a physical activity referral programme in partnership with Macmillan Cancer Support and the eleven district councils / leisure providers across Northern Ireland, each containing a MMNI coordinator. The referral pathway can be through a healthcare professional or self-referral. The MMNI coordinators, as qualified physical activity and exercise specialists, are responsible for implementing the Macmillan Physical Activity Behaviour Change Care Pathway. The overarching aim of the programme is to '*ensure that everyone living with cancer in Northern Ireland is aware of the benefits of physical activity and is enabled to choose to become and stay active, at a level that is right for them*'. This is achieved by providing a personalised plan of supervised physical activity and exercise, information and support to empower individual behavioural change. The programme aims to help people become and remain active, improve their general fitness, better manage the consequences of their cancer treatment, and improve their quality of life, ultimately enjoying the many physical and psychosocial benefits of exercise [9]. Traditionally this service is delivered face-to-face at local leisure centres throughout NI, by specialist coordinators that tailor the physical activity and exercise prescription. As a result of the COVID-19 restrictions, the MMNI service has adapted (remotely using digital technologies e.g. Zoom, YouTube etc) to enable continued service delivery. Whilst these changes have been forced by the COVID-19 pandemic, it underscores the need for scalable remote interventions in the longer term [11]. Innovative technological solutions are cost-effective and have the potential to improve future service delivery, while broadening population reach and accessibility. Providing a dual service of face-to-face classes (once restrictions are lifted) and remote access via digital technology, may help improve long-term service delivery.

However, the impact of COVID-19 on the MMNI programme and the effects of modified service delivery on its users is unknown. Consequently, a service evaluation was conducted, detailing the impact of the COVID-19 restrictions on service users. As COVID-19 restrictions

are currently being implemented globally, the results of this survey may help guide service innovation for similar community-based physical activity and exercise programmes. As detailed above, learning from the transition to remote service delivery and the service user experience, during a global pandemic or similar public health crisis, could be useful in designing and delivering a person-centred service (using mixed delivery methods) to improve access for all.

Methodology

Design and Participants

A cross-sectional sample of participants were actively recruited over a 3-week period, from 8th June 2020 to 28th June 2020 by the MMNI team. Participants were eligible for inclusion if they (1) had received a diagnosis of cancer and (2) directly participated in the MMNI programme. All eligible participants voluntarily provided informed consent online, prior to accessing the survey questions. Consent was sought after participants reviewed the purpose of this service evaluation and a privacy statement, permitting access. All participants were at least 18 years of age, with responses stored in accordance with the UK Data Protection Act (2018) and EU General Data Protection Regulation (2018). Prior to commencing this service evaluation, advice was sought from research governance pertaining ethical review. As this is a service evaluation, it does not fall under the usual ethical procedures and instead we completed a Data Privacy Impact Assessment (DPIA), under the direction of the University Information Compliance Unit. The research team at Queen's University Belfast were blinded to patient identity and all data collection, with anonymity maintained throughout.

Procedures

Participants were identified by the MMNI team via their user database. Initial eligibility was determined by the Macmillan group and confirmed by the lead investigator. Eligible participants received an anonymous multiple-choice questionnaire and short answer online survey, investigating the impact of COVID-19 on the MMNI service for Northern Ireland. The questionnaire and short answer survey was developed by researchers at Queen's University Belfast, using Microsoft Forms and refined through consultation with the MMNI team prior to

a piloted release. Upon review of the pilot data and satisfactory feedback, the questionnaire and short answer survey was distributed to service users via the MMNI coordinators. Participants received a hyperlink to access the online survey through their email. Data was collected and stored electronically for the duration of the recruitment period. Following distribution, participants were sent weekly reminders by email, WhatsApp, text or telephone to ensure maximal uptake. Each participant completed the survey once. For inclusiveness, if participants were unable to access the survey directly (e.g. technological barriers), a Move More coordinator had the capacity to complete on the participants behalf over the telephone.

The online survey was provided in English and consisted of 21 questions in total (5 open-ended questions). Participants were required to provide a response for each question. Limited, non-identifiable demographic data was collected (i.e. gender; cancer diagnosis). Participants were asked to report the frequency and type of exercise (i.e. closed questions) completed prior to and during COVID-19 restrictions. Two open-ended short answer items then provided participants the opportunity to describe in detail the impact of COVID-19 restrictions on their life and any concerns regarding a return to MMNI services when restrictions are eased. The emphasis of the remainder of the survey focused on digitally supported exercise. Participants were asked to simply report if they presently used digital technology to access physical activity / exercise (i.e. yes / no) and if they might consider using digital platforms (e.g. Zoom, FaceTime, mobile apps) for physical activity / exercise delivery in future (i.e. yes / no). Finally, participants were asked to rate on a Likert scale (not at all - very much) the influence of common barriers on exercise participation during COVID-19 restrictions. Participants received no incentive to partake in this service evaluation.

Data analysis

Demographic information was summarised using descriptive statistics. Participant responses obtained from the Likert scale were also summarised descriptively and average scores were calculated. The full free text response data set was analysed thematically according to Miles and Huberman' [12] techniques of labelling, coding, categorising and theme development. The process involved identifying commonalities in the data set and searching and comparing the free text responses to identify relationships and themes. Constant comparative techniques were used to ensure all perspectives were represented in the analysis, and deviant cases examined. In an attempt to eliminate subjectivity, findings were verified and discussed by the research

team at each stage to assess accuracy and credibility of the interpretation, promote inter-rater reliability and ensure rigour [13]. The report uses verbatim comments to illustrate the themes, but any identifiable data has been removed.

Results

Participants

In total, 377 (52% response rate) MMNI service users responded to the survey over the 3-week recruitment period (325 completed by participants; 52 completed by MMNI coordinators on behalf of participants). Participant demographics can be observed in Table 1. Participants were predominantly female (82%), with breast cancer reported as the most prevalent primary cancer site (n = 190). Twenty-six additional cancer sites were reported by 4 participants or fewer (not reported in Table 1.)

Table 1.

Parameters	No. of participants (%)
Gender	
Female	309 (82)
Male	68 (18)
Tumour site	
Breast	190 (50.3)
Prostate	28 (7.4)
Colorectal	22 (5.8)
Lymphoma	18 (4.8)
Ovarian	14 (3.7)
Lung	10 (2.7)
Endometrial	9 (2.4)
Uterine	8 (2.1)
Thyroid	7 (1.9)
Kidney	6 (1.6)
Oesophageal	5 (1.3)

Exercise frequency

Exercise frequency before COVID-19 restrictions and during COVID-19 restrictions are reported in Table 2. The percentage of participants who were not regularly active increased from 4% prior to COVID-19 restrictions to 21% during COVID-19 restrictions. The number of participants reporting physical activity levels of 1 – 2, 3 – 4, and 5 – 6 days / week decreased by 4, 9 and 5 % respectively during COVID-19 restrictions. The number of participants reporting physical activity everyday increased by 1% during restrictions.

Table 2.

	Physical activity level prior to COVID-19 restrictions		Physical activity level during COVID-19 restrictions	
	No. of participants	%	No. of participants	%
Not regularly active	15	4	77	21
1 – 2 days / week	99	27	87	23
3 – 4 days / week	137	36	101	27
5 – 6 days / week	65	17	47	12
Everyday	61	16	64	17

Exercise location

Prior to restrictions the primary setting for exercise was MMNI classes in a leisure facility (n=344). During restrictions, indoor (n=216) and outdoor (n=217) home-based exercise were most common. Forty-four (12%) participants reported no exercise during restrictions.

Type of physical activity / exercise under COVID-19 restrictions

During COVID-19 restrictions participants reported walking (n=283) as the most common form of physical activity completed. Other popular forms of physical activity included gardening (n=149), online MMNI classes (n=137) and their own form of home-based activity, not provided by MMNI (n=159).

Impact of COVID-19 restrictions

Most participants (n=268, 71%) felt the pandemic did have an impact on them, whilst 45 (12%) reported no impact, and 64 (17%) participants were not explicit in their response. To determine the impact of COVID-19 restrictions on MMNI service users, data from the survey answers were coded and grouped into two main categories: (1) Psychosocial, and (2) Physical (see Table 3.)

Psychosocial impact

Most participants highlighted the psychosocial impact of COVID-19 restrictions (n=231, 61%). Psychosocial themes included 1) loneliness, 2) lack of social support 3) decreased motivation to exercise 4) fear, and 5) anxiety. Loneliness and lack of social support were the

most reported psychosocial issues during restrictions. Included below are sample extracts, detailing the psychosocial impact of restrictions:

"Whilst I have been lucky enough to get out for a walk each day and keep physically active, I have not been able to meet or interact with family and friends and I feel this has impacted on my mental wellbeing. That is where meeting up with groups such as the Move More group and a local Tai Chi class I had been attending are so invaluable" (female, breast cancer).

"Missing our regular move more class, missing the social interaction with the rest of the group and our coordinator" (male, prostate cancer).

"At times I feel very isolated, it's affecting my mood. I feel I am back to after my double mastectomy when I had no contact with people. I miss my friends" (female, breast cancer).

"The restrictions have made an impact socially; the MM class was a great way of keeping each other motivated and encouraged. This is now not happening and does have a mental effect" (female, endometrial cancer).

"My routine for physical activity has been completely changed, which has been very challenging to my motivation and physical health and well-being. But more than that it's the social aspect and support that I really miss. Move More is more than just exercise, it's community, it's solidarity, it's inspiration" (male, kidney cancer).

"Feeling more anxious shopping. Groundhog Day feelings. Disturbed sleep & vivid dreams" (male, prostate cancer).

"I am more unsettled, nervous. I felt closed in and frighten at times. I believe Covid-19 effected my mental health" (female, breast cancer).

<u>Physical impact</u>

The physical impact of COVID-19 restrictions was reported by 32% of the participants. Physical themes included 1) deterioration in fitness, 2) deterioration in health, 3) increased pain, 4) increased body weight, and 5) changes in dietary habits. Included below are sample extracts, detailing the physical impact of restrictions:

"My mobility has got worse, my health has deteriorated, and I have had a hospital stay for 9 days (not COVID)" (female, leukaemia).

"I have been unable to lose weight which I planned to do. Therefore, my mood swings are more frequent. I also feel as though my body is not as strong. There has been an overall change in my physical and mental health" (female, lymphoma).

"Not able to join the social group means I'm not as motivated, less physically activity, more likely to not exercise" (male, chronic lymphocytic leukaemia).

"Put on a stone in weight. Bad back and joint problems came back. Feel teary and depressed. I stay longer in bed and going to bed later at night. Consuming more junk food, alcohol. Etc its awful" (female, breast cancer).

"My level of fitness has fallen" (male, oesophageal cancer).

"Going from trying to set up a routine which was mentally and physically beneficial was setback greatly" (male, prostate cancer).

"Yes, because we don't have a coach I'm not doing right exercises and now my body needs toned all over again" (female, ovarian cancer).

Table 3.

Impact	
Psychosocial impact	Loneliness Lack of social support Decreased motivation to exercise Fear Anxiety / Depression
Physical impact	Fitness deterioration Health deterioration Increased pain Increased body weight Dietary changes

Returning to Move More services

Most participants (61%) reported positive feelings about returning to MMNI services when restrictions permit, with no concerns raised (provided COVID-19 mitigation measures are strictly adhered). In contrast, 36% of participants reported concerns of safety, social distancing and hygiene. The following are sample extracts, relating to returning services:

"I don't have many concerns, as long as we are confident that all the sports equipment, we use to carry out our exercises has been thoroughly cleaned for use. The hall is large and social distancing can be achieved. All participants are in the same boat and I trust that they too will be as vigilant as myself, look after each other" (female, breast cancer).

"Yes [concerned], would be nervous about getting the virus" (male, kidney cancer).

"No [concern], feel confident that measures will be put in place, so we have a safe environment." (male, prostate cancer).

"No [concern] because I am confident strict safety measures will be put in place by Macmillan and adhered to by coordinator and participants" (female, breast cancer).

"On one hand I'm so looking forward to returning on the other I am concerned about how social distancing etc will happen" (female, breast cancer).

"Yes [concerns], but I have complete faith in Macmillan, and my co-ordinator to mitigate against any potential problems." (male, kidney cancer).

"Some concerns with regards to circuit training which I love, and these concerns would relate to hygiene...really the use of weights & handling of other equipment" (female, breast cancer).

Using digital technology to access physical activity / exercise

Most participants (n = 233) were currently using digital technology to undertake physical activity or exercise. The devices and applications / software used are reported in Table 4. The most common device used was a smart phone (n = 71), whilst Zoom (n = 60) and YouTube (n = 50) were the most common applications used to access exercise. Of the 144 not currently using digital technology, 62 (43%) stated they were interested in using digital technology in the future.

Table 4.

Digital technology	**No of participants**
Device	
Smart phone	71
PC / laptop	28
Tablet (i.e. iPad)	52
Smart watch	9
Smart television	11
Fitbit	24
Application / software	
Zoom	60
Facebook	9
YouTube	50
WhatsApp	20
Mobile apps (e.g. Strava)	14
Microsoft Teams	1
Internet	26
DVD	1

Preferred method of Move More class delivery under COVID-19 restrictions

Most participants (n = 183) stated that they would prefer to access MMNI classes digitally via the MMNI YouTube channel which has a library of exercise sessions pre-recorded and uploaded. Move More exercise sessions delivered in real-time via platforms including Zoom and Microsoft Teams and through smartphone apps were also preferences amongst 155 and 108 participants, respectively.

Barriers to exercise during COVID-19 restrictions

Most participants (n=194, 52%) reported that they did experience difficulties engaging in exercise during COVID-19 restrictions, whilst 182 participants reported no difficulty in exercising. Most participants (n = 52) reported isolation as a barrier to exercise during COVID-19. Declining health / fitness was reported by 44 participants, with a lack of access (n = 40) and motivation (n = 38) the next greatest barriers.

Evaluation of the Macmillan response to COVID-19 restrictions to increase participation

There was widespread recognition that the MMNI programme were providing options for service users to engage in physical activity / exercise, with most participants (n =263, 70%) happy with Macmillan's proactive response to initial and ongoing restrictions. Extracts relating to the response:

"Our coordinator has done a good job of providing a weekly class on Zoom where we are able to chat and then do our exercises. We can also access a range of exercises provided by various coordinators through YouTube" (female, breast cancer).

"Our exercise class on Zoom is great if I use my laptop, I can see about 5 other participants. And it's good that the coordinators are doing this for us" (female, ovarian cancer).

"With the online classes being streamed and the quiz recently I believe they are doing a great job" (male, prostate cancer).

"Apart from my lack of motivation I feel that my coordinator has been very supportive in what Move More has been able to do and although I haven't been able to join in I do appreciate being kept informed and I am thankful for what exercises are being offered which means I can do these as and when I feel that I am able to" (female, breast cancer).

"Good, versatile engagement and encouragement and as always non-judgemental" (male, colorectal cancer).

"Our coordinator has been excellent as she has organised weekly zoom exercise classes which are fabulous and has also had a 1-1 session with me, via zoom, to direct me to other online sources on YouTube, which are run by the Move More coordinators and the District Councils" (female, ampullary cancer).

"I think my instructor is doing a brilliant job" (male, prostate cancer).

Of the 86 participants (23%) who felt more could be done to help them participate, common themes included outdoor exercise classes, more flexibility with online 'live' (i.e. Zoom) exercise classes, and technological support. Further sample extracts, relevant to the response, are included below:

"More outside activities during restrictions e.g. park exercise etc" (female, breast cancer).

"It would possibly help if we had difficulty with the technology ...that as older participants we would have someone to put our queries to if we were ' stuck ' at any point"(female, breast cancer).

"Outdoor activities in small groups" (male, prostate cancer).

"As the majority of my class are in their 50s/60s technology is not one of our strengths so if there was any way of making it easier to take part in online classes it would t appreciated" (female, breast cancer).

Development of a MMNI App

The majority of participants (n = 300, 80%) reported that they would be interested in using a MMNI smartphone App to receive or participate in live exercise. When asked how they would feel about using an App, the majority of participants (72%) were positive. Common positive themes revolved around facilitating group contact and providing flexibility around current lifestyle:

"I feel this would be very beneficial not only in the present situation but also at times when it is difficult to attend classes due to illness or travelling problems" (female, breast cancer).

"It would be useful to have such an app" (male, prostate cancer).

"Would have no problem with using this form of technology" (male, colorectal cancer).

"An app is good because you can exercise anytime, anywhere and also maybe do 2 or 3 types of exercise depending on what the app offers. It would be good for me when I return back to work especially if Move More classes are on during the day. Participating in live supervised exercise classes are great too. People need encouragement and social interaction. I would need to know that I'm doing the exercises properly for a start. A mixture of both would be great!" (female, uterine cancer).

Although some individuals (16%) did express negative emotions towards an App. Common negative themes which emerged focused on lack of technological proficiency and a preference towards face to face classes:

"I would try it, but I'm limited to my technology skills" (female, breast cancer).

"I would struggle to use an app due to being of the older generation" (female, breast cancer).

"Possibly, but face to face interaction and social side is as important to participants as exercise itself" (male, chronic lymphocytic leukaemia).

"I like people close by and with technology friendships would be difficult to make. I think new participants couldn't gel into the group and get the support they might require. I would miss the banter, the jokes and speaking with a number of people in the group" (male, prostate cancer).

Discussion

The aim of this service evaluation was to detail the impact of the COVID-19 restrictions on people living with cancer, who engage in the MMNI programme and to evaluate perceptions on alternative approaches to service delivery. The societal restrictions imposed in response to the COVID-19 pandemic have limited the ability of exercise programme providers to deliver supervised face-to-face exercise. This may have significant effects on wellbeing, since frequent exercise is recommended to help people living with cancer maintain both physical and psychosocial wellbeing [9]. The current study demonstrates the impact of COVID-19 restrictions on the physical and psychosocial wellbeing of MMNI service users, which has been further compounded by the restrictions imposed on MMNI capabilities to deliver face to face exercise classes. To continue MMNI services and promote exercise during restrictions, the Move More coordinators responded with service adaptations involving 'live' exercise sessions, facilitated through digital technology (e.g. Zoom), and the development of recorded exercise sessions uploaded to YouTube, accessible at any time. This response was welcomed by MMNI service users with a positive, large-scale adoption of digital technology for exercise provision, and further interest in digital based solutions.

Although interest and engagement in home-based exercise in the general population surged briefly when restrictions were originally implemented [14], disruptions to cancer exercise services such as MMNI removed an important supervised and supportive environment for cancer survivors to participate in group exercise. Due to this, cancer patients risk regressing to a sedentary lifestyle which may have a negative impact on their physical and psychosocial wellbeing [15]. Results from the evaluation confirmed the impact of reduced face-to-face MMNI services and subsequent reductions in exercise frequency. Respondents reported both physical and psychosocial impact of restrictions including loneliness, loss of social support, loss of motivation, deterioration in fitness / health, and negative changes in body composition. Even though breast cancer was heavily represented, possibly as a result of a fine-tuned referral pathway to the service or the strength of the evidence base for exercise in breast cancer survival - lending to greater engagement, these themes were typical across gender and all cancer

diagnoses. However, with the enforced loss of such essential community cancer exercise services during restrictions and the physical and psychosocial impact on wellbeing, this highlights the need for the rapid development of alternative interventions which can safely, and reliably deliver tailored exercise in participants homes whilst providing a social network of support [15].

Data from pre-COVID-19 studies in prostate cancer suggests that switching from supervised to home-based exercise may not confer any additional benefits to physical and psychosocial outcomes including fatigue and quality of life, and body composition [16–18]. Detrimental changes in body fat may also occur during a COVID-19 imposed lockdown [19] and may negatively impact metabolic health, and disease prognosis, highlighting the necessity for continued exercise support. Optimising an exercise stimulus and facilitating the intervention through digital technology, may help increase contact with participants and maintain motivation and adherence [15, 20]. The new age of COVID-19 restrictions means cancer exercise services will be required to adapt quickly to the changing environment. MMNI responded to the COVID-19 challenge and reductions in their service with innovative service provision. This included a bank of pre-recorded exercise sessions uploaded to YouTube. Sessions created and uploaded to internet servers (e.g. YouTube) offer convenient access to unsupervised exercise for those with regular exercise habits, but may be unlikely to promote adherence in the majority of people affected by cancer [15] Facilitating exercise with digital technology and offering supervised group-based exercise 'live' via digital platforms (e.g. Zoom), can introduce remote supervision, camaraderie and peer support normally associated with this approach and may drive greater adherence and effectiveness [21]. The success of these service changes is reflected in their widescale adoption. The results from this survey highlight a positive adoption of new exercise behaviours, with most participants accessing technology facilitated exercise, through Zoom. This is likely influenced by the ubiquity of digital / mobile technology for health, and its convenience and flexibility [22].

Although largely positive data supported the response of MMNI during restrictions, some concerns were raised by participants regarding a lack of technological support. The need for more technological support is unsurprising given that most cancer survivors are over 65 years old [23], and despite the growing ubiquity of mobile technology in this age group, many may not have the technological proficiency to effectively use the technology to support exercise [24]. Supplementary technology-specific support (e.g. access and navigating digital platforms)

is required to enable participants to fully utilise novel technologies, to facilitate their remote exercise programming. Indeed, the current data highlights an eagerness within the sample to adopt new technologies with the majority (n = 300) keenly backing the development of a MMNI mobile app. This overwhelmingly positive response may have stemmed from their experiences of using digital technologies to support their exercise regime during restrictions (62%) or indeed the continued need to avail of support in general, using the medium of technology as an outlet. Since a lack of instruction and guidance is a common barrier to technology adoption in older adults [25], for an App to be successfully implemented, appropriate education and support is necessary. In addition, the involvement of all stakeholders in a user-centred design approach would likely optimise the App. Such an approach would ensure the App is evidence-based, theoretically informed and practical, including all the information and features to enable early uptake and implementation [26]. Given people with cancer may at times live with numerous side effects of treatment (e.g. fatigue; neuropathy; immunosuppression etc) which may inhibit commuting for exercise classes, as well as the present restrictions imposed, investment in a smart application may prove advantageous to ensure remote engagement, allowing participants to continue to avail of the benefits of the MMNI service. The current circumstances (i.e. COVID-19 restrictions) have forced users to become innovative and embrace technology, so this may prove an optimal time to develop app-based delivery, whilst participants are receptive to change. For as long as restrictions persist, it could provide a pragmatic, cost-effective alternative for exercise delivery.

Limitations

This service evaluation is not without limitations. The inclusion of free text questions within the survey aims to provide a deeper understanding of participants experiences as quantified in numerical responses of a survey. The results of these questions should, however, be interpreted with caution. Free text responses were often limited to one or two sentences which may reduce the potential to understand the context of the participant experience. In addition, a small number of participants did not provide free text responses. This may be indicative of participant burden in relation to survey completion or indeed it may be that these participants were uneasy documenting negative experiences. We are reasonably confident the latter was not the case though, given the reporting of both positive and negative experiences within. A further and important limitation is the representation of the sample. Females with a diagnosis of breast cancer comprise half the respondents, with males underrepresented and accounting for only

18%. This suggests, that while common themes were reported for both genders, the results are more representative of female experiences within the MMNI service. Lastly, the self-reported nature of physical activity levels, might also present a limitation (e.g. over/under-reporting). Despite these limitations, this study provides an evaluation of the impact of COVID-19 restrictions on MMNI service users in Northern Ireland, and the response of this service to national adversity.

Conclusions and Recommendations

Findings have confirmed a reduction in exercise participation amongst regular users of the MMNI service when face-to-face sessions ceased in response to restrictions imposed by the global COVID-19 pandemic. Although, the adoption of digital technology to help access exercise remotely was reported, service users described the negative impact of the restrictions on their physical and psychosocial wellbeing. Alternative methods of delivery introduced by MMNI to continue service provision, were positively welcomed and an eagerness was evident for the continued development of tailored digital technology to deliver targeted exercise to Move More users. Such technology used alongside face-to-face sessions (when restrictions permit) has the potential to reach a larger population, including those who report competing interests and programme location as barriers to participation in community exercise programmes [27] and would bring added benefit alongside the current MMNI model post-COVID-19 restrictions. However, concerns were raised regarding technological proficiency and a lack of education in technology use amongst this group. As such, below we outline recommendations for future practice of MMNI services in the changing COVID-19 environment based on the results of this study.

1. Some participants reported a negative response to the use of digital technology to facilitate exercise delivery. These concerns focused on a lack of education and technological proficiency to adopt technology effectively. Additional resource and / or support to ensure all participants receive basic educational materials and practice on using digital applications is required to facilitate remote exercise delivery.

2. Participants reported an eagerness to adopt digital technology provided appropriate education was provided. As such, the development of a mobile app appears a feasible

option in this cohort. Considerations should be given to including all stakeholders in the development of a MMNI app, through a user-centred design approach.

3. Loneliness, isolation and loss of social support have been mentioned as psychological issues throughout the report by many participants. Therefore a buddy system or MMNI champion should be explored / considered, to enable the provision of peer support in addition to the support from MMNI coordinators.

4. A number of responses stated a willingness to partake in physical activity sessions outdoors, whilst indoor activities were prohibited. For as long as restrictions persist and where Government guidelines permit, a suitable outdoor MMNI programme should be considered, developed and implemented.

5. Whilst adopting digital / remote support in response to COVID-19 was readily received by both MMNI coordinators and participants, many participants are not technically proficient or have access to such technology and given that many people living with cancer are over 65 years old [23], providing written physical activity information (including suitable activities) by post, should be considered.

The learning and development evolving from the mixed methods of exercise delivery should be considered when seeking to maximise the reach and engagement of people living with cancer, from their diagnosis onward, to support an individualised person-centred approach to exercise and behavioural change. Given the rapid response and subsequent versatility of the MMNI programme, it could be considered an example of best practice or model to follow for other cancer support services.

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