Pandemic-Related Differences in Physical and Mental Health of Older Adults

Chun Fatt Lau
University of Malaya
Nur Husna Shahimi
University of Malaya
Sumaiyah Mat
University of Malaya
Sheng Hui Kioh
University of Malaya
Ee Ming Khoo
University of Malaya
Mohd Idzwan Zakaria
University of Malaya
Nurliza Khaliddin
University of Malaya
Mazlina Mazlan
University of Malaya
Selina Khoo
University of Malaya
Nor Izzati Saedon
University of Malaya
Hui Min Khor
University of Malaya
Samuel R Nyman
Bournemouth University
Karen Morgan
University of Malaya
Maw Pin Tan (mptan@ummc.edu.my)
University of Malaya

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Abstract

Background

As a result of the COVID-19 pandemic, changes in data collection methods have been introduced in research to ensure continuity despite physical distancing and lockdown restrictions. However, little is currently known about the potential differences in information collected using these traditional face-to-face methods compared to the incorporation of virtual methods to address the above, particularly in studies involving older adults.

Aims

Our objectives were, therefore, to compare data collected during the pandemic using hybrid methods from older individuals participating in falls research to that collected through traditional face-to-face methods.

Methods

Participants comprised of individuals recruited to two fall studies which hurdled the start of the COVID-19 pandemic. Both studies recruited individuals aged 60 years and over with at least one fall in the past 12 months, and controls with no history of falls in the past 12 months. Pre-pandemic, individuals were interviewed face-to-face exclusively, those interviews after the start of the pandemic were conducted virtually with physical assessments conducted face-to-face to minimize physical contact. Cognitive, physical, and psychological status were determined using the visual cognitive assessment tool (VCAT), timed-up-and-go (TUG), functional reach (FR), handgrip strength (HGS), and the 21-item depression, anxiety and stress scale (DASS-21). In addition quality of life, physical activity and social participation were also measured.

Results

Of the 145 participants (median age (interquartile range, IQR) of 73.5 (67-81) years), 69 (47.6%) were interviewed face-to-face, while 76 (53.4%) were assessed using a hybrid method. Participants in both groups had similar age, gender, ethnic breakdown, marital status, education levels, anthropometric measurements, and medication burden. More face-to-face participants had hypertension and fall compared to hybrid participants Differences were observed in presence of fall characteristics, with fewer fallers seeing a doctor and more fallers attending the emergency department after the start of the pandemic. After adjustment for baseline differences, participants interviewed using hybrid status had lower depression scores (odds ratio, OR (95% confidence interval, CI)=0.29(0.14-0.61) and stress scores (OR(95%CI)=0.33(0.15-0.72)), but greater fear of falling (OR(95%CI)=2.16(1.04-4.48)) and reduced social participation (OR(95%CI)=2.64(1.20-5.79)).

Conclusion

Alterations in recruitment and data collection methods to overcome pandemic restrictions should take into consideration potential differences in individuals who agree to participate as well as the influence of major life events on the psychological status of participants.

Background

The coronavirus disease 2019 (COVID-19) pandemic and associated public health measures undertaken to contain it have caused widespread and unprecedented socioeconomic disruption. At the time of writing, more than 96 million positive cases have been recorded with at least two million deaths globally [1]. On March 18th, 2020, nationwide lockdown measures were enforced by the Malaysian government, which included travel restrictions, mandatory closure of schools, non-essential commercial activities, and industries. People were asked to stay at home and socially isolate themselves to prevent infection [1].

Infection control measures to contain the spread of the Severe Acute Respiratory Syndrome Coronavirus-2 have curtailed research activity, particularly clinical research where face-to-face contact have been necessary [2]. Research on ageing was arguably most seriously affected as older adults are considered a high-risk group for COVID-19 [3]. While most research ceased or slowed down to reduce the risk of COVID-19 transmission, some researchers have endeavoured to ensure the continuation of research by converting face-to-face data collection methods to virtual or hybrid methods. Similar measures may also be applied in ageing research to reduce the risk of COVID-19 transmission [4]. However, as ageing is stereotypically framed with frailty and incompetence, not surprisingly there is an innate bias in the use of technology in older adults leading to the exclusion of older adults from the research during this period [5].

The use of technology has increased during the pandemic as it enables key components of our social, educational, and occupational lives to continue. Despite its potential, few have studied the adaptation of virtual technology for ageing research [6]. As a switch to virtual or hybrid data collection was unavoidable to ensure continuation of valuable clinical studies involving older adults, it is important to determine potential changes in the data with the change in samples recruit, data collection methods, and living circumstances to aid interpretation.

Aims

Our objectives were, therefore, to identify potential differences in data collected face-to-face prior to the COVID-19 pandemic and using a hybrid method taking into account physical distancing measures after the start of the COVID-19 pandemic.

Methods

Sample Population

This was a cross-sectional study. Participants were drawn from the baseline data obtained from two ongoing falls studies, the Life After Falls (LiAF) and the Obesity, Sarcopenia and Falls in Older Persons (OSFOP) studies. The sample population comprised individuals aged 60 years and over with a history of at least one fall in the past 12 months recruited via word of mouth, community health promotion events, and from the primary care department, outpatient clinics, or emergency department at the University of Malaya Medical Centre. In addition, participants were recruited from wave three follow-up interviews of the Malaysian Elders Longitudinal Research study who reported falls in the past 12 months [7]. Control participants were primarily recruited through spouses, siblings, accompanying persons and acquaintances of the participants who meet the age criteria and did not have any falls in the past 12 months. The intended recruitment ratio for fallers to non-fallers was 3:1. Individuals with significant fractures such as hip or femur fractures and head injuries were excluded. Data collection commenced in January 2019 through hospital-based, face-to-face assessments which came to an abrupt halt when movement control orders were enforced on 18th March 2020. The study immediately switched to hybrid data collection methods, and data collection through this alternative method continued up to December 2020. Virtual interviews were conducted using one or more of the virtual communication devices of a smartphone, computer tablet or personal computer (laptop or desktop) using telephone calls, social media messaging or video calls and video conferencing (Meet^{TM}, Google Inc., USA), according to participants choice and availability of technology to the participant. Written informed consent was obtained from all participants, though virtual interviews were first conducted following verbal consent and written consent sought at a subsequent face-to-face visit, as per approval from the ethics committee. Whenever movement control orders were permissive, participants were invited to a satellite research centre, 1.5km away from the hospital, with ground-floor disabled access and off-street open-air parking, and only physical assessments that could not be performed virtually were conducted during the visits to minimise time of exposure, with a maximal visit time of 30 minutes compared 1.5 hours when the assessment was conducted using face-to-face methods exclusively. The study had obtained approval from the Institutional Ethical Review Board (MECID: 2019525-7445) prior to commencement and a subsequent application for amendment to hybrid methods and accelerated approval was obtained.

Data collection

Baseline data collected included falls history, medications, cognitive testing, postural blood pressure, physical performance, quality of life (QoL), psychological status, and social network and participation. Immediately after the announcement of lockdown measures, researchers comprising geriatricians, psychologists, an ophthalmologist, a rehabilitation physician, an emergency physician, a primary care physician and a gerontologist changed the original assessments to hybrid assessments within social media messaging (WhatsApp^{TM}, USA) chat group. Study data were collected and managed using REDCap electronic data capture tools [8, 9].

Falls History

Location of falls, the total number of falls in the past year, any injuries sustained, and any medical treatment received post-fall were also recorded. No alteration in fall history data collected was made apart from transitioning from face-to-face to hybrid assessments.

Physical Performance

Physical performance was conducted face-to-face for both methods, with the inclusion of standard operating procedures for infection control when data collection was switched to hybrid. This was assessed using grip strength and the timed-up and go test (TUG). Grip strength was measured using the Jamar hydraulic hand dynamometer (Sammons Preston, Illinois, USA). Beginning with the dominant hand, the participant was asked to grip as hard as possible with their elbow flexed at 90 degrees in the seated position. Three measurements were obtained for each hand. For the TUG test the participant was instructed to rise from a standard chair with arms, walk at their normal speed using their usual walking-aid and regular footwear, to a marker at three meters away from the front legs of the chair, turn around and walk back to the chair and sit back down again. The TUG time was considered the time between the participant's back leaving and touching the back of the chair. Functional reach (FR) was the maximal forward reach in centimetres from the upright position measured from the tip of the middle finger with the participant standing with the left arm outstretched, parallel and left shoulder adjacent to a wall with a metre rule attached.

Cognitive Assessments

Cognitive performances were assessed face-to-face for both face-to-face and hybrid participants. Methods and determined using the Visual Cognitive Assessment Tool (VCAT) [10]. The VCAT is a non-language dependent tool evaluating the cognitive domains memory, executive function, visuospatial function, attention, and semantic knowledge with minimum and maximum scores of 0 and 30 respectively. A higher score indicates better cognitive ability.

Orthostatic Hypotension

Blood pressure responses to posture change were assessed using a continuous non-invasive monitoring machine (Task Force Monitor, CNSystem, Austria). Synchronized physiological signals (ECG and beat-to-beat arterial blood pressure) are monitored throughout the experiment to determine the profile of blood pressure change during 10-minutes' supine rest followed by 3-minutes' active stand. Beat-to-beat blood pressure measurements were calibrated against oscillometric measurements obtained at the start of the recording. With virtual assessments, measurements were delayed to a later suitable date.

Medication Review

Medications were initially assessed using face-to-face methods, and this was switched to virtual interviews after the initial lockdown. Participants were asked to show the researcher all their medications in their original packaging, as well as prescription orders for their medications. Comparisons were made with hospital electronic records of prescriptions if available.

Validated Questionnaires

The mode of administration for all questionnaires was switched from face-to-face to virtual assessments whenever possible. For face-to-face assessments, the interviewer would sit next to the participant with a printed version of the questionnaire in front of them, and the interviewer would assist the participant in the completion of the questionnaire by reading out the questions and answers and marking the selected answers. The questionnaires were administered always in the same order, starting with social network and participation, followed by activities of daily living, physical activity, quality of life and ending with psychological status. During the virtual interviews, the questions and responses would be read out verbatim. If the participant's attention waned during the virtual interviews, the researchers would discontinue the interview and complete the questionnaires during the face-to-face visit.

Social Network and Participation

Lubben's social network scale-6 (LSNS-6) and the Keele's assessment of participation (KAP) were used to assess social networks and participation. The LSNS-6 measures the size of active and intimate networks of family and friends with whom respondents can talk or call on for help. Scores range from 0 to 30, with higher scores indicating stronger networks. The KAP is intended to measure an individual's level of participation in various activities such as work, education, social activities, and activities of daily living. A minimum score of 0 indicates no participation restrictions (a score of 1-11 indicates participation restriction in at least one activity).

Instrumental Activities of Daily Living

Functional ability was evaluated using the Lawton Instrumental Activities of Daily Living (IADL) scale [11]. The Lawton scale was scored dichotomously on eight items enquiring about telephone use, shopping, food preparation, housekeeping, laundering, use of transportation, medication use and managing money. The maximum total score was therefore eight, with a higher score indicating a higher level of independence.

Physical Activity

Physical activity was assessed with the Physical Activity Scale for the Elderly (PASE). Information on leisure, household, and occupational activity are included. The PASE assesses the types of activities typically chosen by older adults, for example, recreational activities, exercise, housework, gardening, and caring for others. The score is calculated based on the frequency, duration, and intensity level of activity over the previous week, ranging from scores 0 to 793. A higher score indicates greater physical activity. Physical activity level immediately prior to the most recent fall would be recorded.

Quality of Life

QoL was assessed with the locally validated 12-item Control, Autonomy, Self-realization and Pleasure questionnaire (CASP-12). The CASP-12 is a shortened version of CASP-19. It is a 12-item Likert-scaled index, composed of the items pertinent to the subscales control or autonomy, participation, and self-realization, intending to capture quality of life in older adults. Higher scores indicate better quality of life. The minimum and maximum scores are 12 to 48 respectively [12].

Psychological Assessments

Depression, Anxiety and Stress were evaluated using the 21-item Depression, Anxiety and Stress Scale (DASS-21). This is a self-reported measure in which participants rate the frequency and severity of the negative emotions of depression, anxiety, and stress over the previous week. Frequency and severity ratings were made on a series of 4-point scales, with 0 indicating “did not apply to me at all” and 3 indicating “applied to me very much, or most of the time.” The scores were calculated individually for the three components: depression, anxiety, and stress. The total score for each component was dichotomized using median values as the cut-offs, depression ≥2, anxiety ≥2, and stress ≥2, respectively [13].

Fear-of-falling was assessed with the 7-item Falls Efficacy Scale-International (short FES-I) The short FES-I consists of seven items on a 4-point Likert scale, with 1 indicating no concern and 4 indicating severe concern. The minimum and maximum scores for the short FES-I are therefore 7 and 28, respectively. To allow for adjustment for potential confounders, cut-offs were developed using the median values; subjects with a score of ≥10 were considered to have greater fear of falling [14].

Data Analysis

Descriptive and analytical statistical analyses were performed using SPSS 24.0. All continuous data were tested for normality. Participants' basic characteristics were summarized as means with standard deviations or medians with interquartile ranges for continuous variables and frequency with percentages for categorical variables. Parametric and non-parametric comparisons were performed using the independent t-test or Mann-Whitney U for continuous variables, while categorical variables were compared using frequency with percentages. Logistic regression methods were then utilized to adjust for potential confounders which were identified from bivariate variables with $p<0.05$. The strength of associations was depicted as odds ratios (OR) and 95% confidence intervals (CI).

Results

Study population

A total of 145 participants were recruited, of which 69 (47.6%) were interviewed face-to-face pre-lockdown and 76 (53.4%) were hybrid interviewed after pandemic lockdown measures were implemented. Of the 145 participants, 88 (60.7%) were women with a median age (IQR) of 73.5 (67-81) years.

Characteristics of participants

Sociodemographic

Participant characteristics are summarized in Table 1 according to method of data collection. There was no significant difference in age, gender, ethnicity, marital status, education level, anthropometric measurements, and number of medications. There was a significant difference in the number of

underlying physical comorbidities, where more participants interviewed face-to-face had hypertension, depression, and cataracts.

Fall characteristics

There was a difference in proportion of fallers between the participants interviewed face-to-face and the participants interviewed using hybrid means: 85.5% of participants interviewed face-to-face had at least a fall in the past 12 months compared to the 71.1% of participants interviewed virtually. Among fallers, there were significantly more falls in the bedroom among those interviewed using the hybrid method compared to those interviewed face-to-face. Differences in healthcare-seeking behaviour were observed between fallers interviewed using face-to-face and hybrid methods with participants interviewed face-to-face more likely to see a doctor after their fall, while those who were interviewed using hybrid methods were more likely to attend the emergency department. While there was no significant difference in fracture rates, there was a significantly higher proportion who needed stitches in those interviewed using hybrid methods compared to those interviewed face-to-face.

Cognition, physical performance, psychological, physical activity, quality of life and social participation

Table 2 displays the comparison of cognitive performance, physical performance, psychological status, physical activity, quality of life and social participation scores between participants interviewed face-to-face and the participants interviewed through hybrid means. Hybrid participants had a significantly higher cognitive function, better functional reach test results, lower depression scores and stress scores, and higher quality of life compared to the participants interviewed face-to-face.

Table 3 showed the unadjusted and adjusted odds ratios for cognitive performance, physical performance, psychological status, physical activity, quality of life, and social participation scores. Following adjustment for baseline differences in history of falls and history of hypertension, hybrid participants had significantly lower depression scores and stress scores, higher falls efficacy scores and were at greater risk of social isolation than participants interviewed face-to-face

Table 1
Comparison of sociodemographic and medical history of face-to-face and hybrid participants

Variables	Total	Face-to-face	Hybrid	p value
N	145	69	76	
Age (years), median (IQR)	73.5 (67-81)	75 (68-80.5)	73 (66-81)	0.246
Female, n (%)	88 (60.7)	40 (58)	48 (63.2)	0.525
Ethnicity, n (%)				
Malay	31 (21.4)	8 (11.6)	23 (30.3)	0.311
Chinese	83 (57.2)	49 (71)	34 (44.7)	
Indian	31 (21.4)	12 (17.4)	19 (25)	
Marital Status, n (%)				
Single/never married/divorced/widowed	51 (35.2)	17 (24.6)	34 (44.7)	0.120
Married	94 (64.8)	52 (75.4)	42 (55.3)	
Education level, n (%)				
No formal education/ primary	42 (29)	20 (29)	22 (28.9)	0.893
Secondary	56 (38.6)	26 (37.7)	23 (28.9)	
Certificate/skill	47 (32.4)	23 (33.3)	24 (28.9)	
Anthropometric measurements, median (IQR)				
Height (cm)	157 (150-164)	157 (150-164)	157 (150-165)	0.953
Weight (kg)	57 (50.5-67.0)	55 (51-63)	59.3 (50-71.8)	0.286
Body mass index (kg/m^2)	23.1 (20.9-26.6)	22.9 (21.4-25.6)	23.3 (20.3-28.4)	0.312
Waist circumference (cm)	88 (79-99)	87.5 (81-98)	89 (78-99.8)	0.826
Hip Circumference (cm)	99 (92-105)	97.5 (92.8-103)	100 (92-109)	0.462
Waist hip ratio (cm)	0.900 (0.850-0.963)	0.9 (0.86-0.98)	0.905 (0.83-0.95)	0.262
Physical comorbidities and symptoms, n (%)				
Myocardial infarction	12 (8.3)	6 (8.7)	6 (7.9)	0.862

Variables	Total	Face-to-face	Hybrid	p value
High blood pressure	71 (49)	43 (62.3)	28 (36.8)	0.002*
Diabetes	41 (28.3)	21 (30.4)	20 (26.3)	0.584
Cerebrovascular disease	14 (9.7)	9 (13)	5 (6.6)	0.19
Arthritis	15 (10.3)	9 (13)	6 (7.9)	0.311
Depression	4 (2.8)	4 (5.8)	0 (0)	0.034*
Parkinson	6 (4.1)	2 (2.9)	4 (5.3)	0.477
Asthma	8 (5.5)	5 (7.2)	3 (3.9)	0.387
Osteoporosis	5 (3.4)	3 (4.3)	2 (2.6)	0.573
Cataract	11 (7.1)	11 (15.9)	0 (0)	<0.001*
Renal disease	7 (4.8)	4 (5.8)	3 (3.9)	0.605
Hyperthyroid	4 (2.8)	2 (2.9)	2 (2.6)	0.922
Arthritis	15 (10.3)	9 (13)	6 (7.9)	0.311
Heart failure	6 (4.1)	1 (1.4)	5 (6.6)	0.123
Number of medications, n (%)				
≥5	54 (37.2)	30 (43.5)	24 (31.6)	0.140
<5	91 (62.8)	39 (56.5)	52 (68.4)	
Fall History, n (%)				
Had falls in the past 12 months	113 (77.9)	59 (85.5)	54 (71.1)	0.018*
Frequency of falls in the past 12 months				
Once	71	38 (55.1)	33 (43.4)	0.142
Twice	21	11 (15.9)	10 (13.2)	
3 times	13	3 (4.3)	10 (13.2)	
≥ 4 times	8	7 (10.1)	1 (1.3)	
Location of fall at home				
Bathroom	12	7 (10.1)	5 (6.6)	0.438
Living room	15	5 (7.2)	10 (13.2)	0.245
Bedroom	19	5 (7.2)	14 (18.4)	0.047*

Variables	Total	Face-to-face	Hybrid	p value
Stairs	4	2 (2.9)	2 (2.6)	0.922
Kitchen	4	2 (2.9)	2 (2.6)	0.922
Hallway	2	1 (1.4)	1 (1.3)	0.945
Garden	7	1 (1.4)	6 (7.9)	0.072
Seeing a doctor after fall	52	34 (49.3)	26 (34.2)	0.047*
Attending emergency department	43	14 (20.3)	29 (38.2)	0.019*
Injury sustained				
Fractures	13	9 (13)	4 (5.3)	0.103
Cut requiring stitches	10	1 (1.4)	9 (11.8)	0.014*
Notes: *Mann–Whitney U test was used for the non-parametric continuous data. *p < 0.05				

Table 2
Comparison of cognitive and physical performance, psychological status, physical activity, quality of life, and social participation of face-to-face and hybrid participants

	Face-to-face	Hybrid	p-value
	(n=69)	(n=76)	
VCAT, median (IQR)	24.0 (17-28)	26 (22-29)	0.038*
Functional measurements, median (IQR)			
TUG test (s)	14.1 (10.6-30.2)	13.7 (10.4-18.9)	0.412
Functional reach test (cm)	22 (15-27)	26 (19.8-31)	0.027*
Dominant Handgrip strength (kg)	18.1 (13.1-21.2)	18.7 (13.4-21.2)	0.481
DASS-21,* median (IQR)			
Depression score	2 (0-10)	0 (0-2)	<0.001*
Anxiety score	4 (0-6)	2 (0-6)	0.072
Stress score	6 (2-12)	2 (0-6)	0.002*
Short FES-I,* median (IQR)	9 (7-13.5)	12 (7.5-16.5)	0.095
KAP,* median (IQR)	3 (1-7)	3 (2-5)	0.761
CASP12,* median (IQR)	27 (22-32)	32 (25-35)	0.016*
PASE,* median (IQR)	54 (17-108)	78 (19-119)	0.445
Lawton's IADL,* median (IQR)	7 (3-8)	7 (3.5-8)	0.955
LNSN-6, * median (IQR)	17 (11-21)	18 (13-20)	0.495
DASS-21, n (%)			
Depression ≥ 2	46 (66.7)	29 (38.2)	0.001*
Anxiety score ≥ 2	49 (71)	43 (56.6)	0.077
Stress score ≥ 2	52 (75.4)	40 (52.6)	0.007*
Short FES-I ≥10, n (%)	34 (49.3)	45 (59.2)	0.140
KAP ≥3, n (%)	41 (59.4)	54 (71.1)	0.066
CASP12 ≥29, n (%)	30 (43.5)	44 (57.9)	0.056
PASE ≥71, n (%)	31 (44.9)	40 (52.6)	0.242

Notes: *Mann–Whitney U test was used for the non-parametric continuous data. Dichotomized data were categorized using median values. *p < 0.05

	Face-to-face	Hybrid	p-value
Lawton's IADL ≥7, n (%)	41 (59.4)	45 (59.2)	0.787
LNSN-6 ≥18, n (%)	33 (47.8)	41 (53.9)	0.322

Notes: *Mann–Whitney U test was used for the non-parametric continuous data. Dichotomized data were categorized using median values. *p < 0.05

Table 3
Unadjusted and adjusted odds ratios for cognitive and physical performance, psychological status, physical activity, quality of life, and social participation

	OR (95% CI)	p-value	Adjusted OR[a] (95% CI)	p-value
VCAT ≥ 25	2.04 (0.98-4.24)	0.055	1.91 (0.84-4.35)	0.122
Functional measurements, median (IQR)				
TUG test ≥ 14(s)	0.81 (0.39-1.69)	0.579	1.34 (0.59-3.05)	0.482
Functional reach test ≥ 25(cm)	2.20 (1.07-4.54)	0.033*	1.53 (0.70-3.34)	0.289
Dominant Handgrip strength ≥ 18 (kg)	1.29 (0.63-2.63)	0.491	0.84 (0.38-1.84)	0.662
DASS-21, n (%)				
Depression ≥ 2	0.32 (0.16-0.63)	0.001*	0.29 (0.14-0.61)	0.001*
Anxiety score ≥ 2	0.53 (0.26-1.08)	0.077	0.59 (0.27-1.27)	0.175
Stress score ≥ 2	0.37 (0.18-0.77)	0.007*	0.33 (0.15-0.72)	0.006*
Short FES-I ≥10, n (%)	1.65 (0.85-3.22)	0.140	2.16 (1.04-4.48)	0.039*
KAP ≥3, n (%)	1.94 (0.95-3.95)	0.066	2.64 (1.20-5.79)	0.016*
CASP12 ≥29, n (%)	1.92 (0.98-3.76)	0.056	1.71 (0.81-3.60)	0.157
PASE ≥71, n (%)	1.49 (0.77-2.88)	0.242	1.31 (0.64-2.65)	0.462
Lawton's IADL ≥7, n (%)	1.10 (0.56-2.15)	0.787	0.80 (0.38-1.67)	0.557
LNSN-6 ≥18, n (%)	1.40 (0.72-2.71)	0.322	1.34 (0.67-2.68)	0.416

Notes: Mann–Whitney U test was used for the non-parametric continuous data. Dichotomized data were categorized using median values. [a]Adjusted for history of falls and hypertension. *p < 0.05

Discussion

The COVID-19 pandemic is an unprecedented time, and it is a challenge to strike a balance between advancing ageing research and keeping vulnerable older adults safe. Our study has demonstrated that virtual interviews utilizing modern communication devices can minimize face-to-face data collection with older adults. Characteristics of falls and healthcare-seeking behaviour in fallers were different between those assessed using face-to-face and hybrid methods. Those interviewed face-to-face were more likely to see a doctor after their fall, while those who were interviewed virtually were more likely to attend the emergency department. As the COVID-19 pandemic intensified, emergency departments became quieter because people felt afraid to come to the hospital or the emergency department due to fear of being exposed to the virus [15, 16]. Therefore, the waiting time in ED became shorter and ironically became more accessible to the older adult with a fall. Conversely, the pandemic has made it more difficult to access general practice (GP) as face-to-face visits GP practices were only allowed through an appointment with a reduction in availability of appointments to allow for infection control measures such as donning and doffing of personal protective equipment. While many GP practices compensated through teleconsultations, a person presenting with a fall would be redirected to the emergency department, as legal and professional guidance specifies that new medical presentations, such as a fall, still required a face-to-face visit [17, 18].

Despite the recruitment methods being held constant for face-to-face and hybrid participants, we had fewer fallers recruited into the hybrid interviews resulting in recruitment bias. Those who declined due to other commitments prior were now able to take part as their usual routine activities were prohibited by lockdown measures. Those who were falling, on the contrary, and needed medical attention now avoided hospitals due to the fear of contracting COVID-19 [19]. Decisions on appropriate recruitment and survey methods to adopt with regards to ensuring the continuity of research during the COVID-19 pandemic have been challenging [20]. Few studies have validated virtual data collection methods and are areas for future investigation [21].

Older adults interviewed face-to-face had higher depression and stress scores measured by DASS-21 compared to the older adults assessed using hybrid methods. Social participation was lower in hybrid participants compared to face-to-face participants as an expected effect of movement restriction orders. These differences could well be attributed to the change in data collection methods. However as illustrated in the observed reduction in social activity due to social distancing and lockdown measures, the differences between the two groups may also be attributed to pandemic effects [22]. While a link between social isolation with associated with increased anxiety and depression has been reported [23]. However, emerging studies have also suggested that, unlike their younger counterparts, negative psychological consequences of COVID-19 were not evident among older adults [24]. A separate Malaysian study conducted during the pandemic suggested increased self-perceived social-psychological prosperity among older participants during periods when movement control orders were implemented [25].

It is not possible to clearly differentiate potential biases introduced to recruitment by the pandemic from those introduced through changes in data collection methods as well as the psychological and social

effects of the pandemic. Hence studies that have elected to carry on during the pandemic by switching to hybrid or virtual methods should be interpreted with an awareness of these compound effects, and studies on the psychological effect of COVID-19 are urgently required. Future studies that validate virtual data collection methods, once pandemic restrictions are completely lifted, are needed to aid interpretation of studies such as ours that have converted to hybrid methods. To adapt to the limitations caused by the pandemic, we mobilized our research platform for patient needs, such as a research outpost within the community with ground-floor shopfront access so that the participants could complete the rest of the assessments without having to attend hospital [4]. It was still not possible to switch all our data collection to virtual assessment exclusively, but the incorporation of virtual assessments allowed us to minimise exposure time to the older persons. The attention span of older adults is also potentially shorter with virtual interviews, and hence many had to complete their psychological assessments during the face-to-face visits.

Conclusion

Our study described the pivoting of the research from face to face to hybrid methods to ensure the continuity of public-funded research. Thorough process evaluations are required for subsequent interpretation as allowances will have to be made for differences in characteristics of recruited participants as well as the potential effects of the pandemic on the psychological, social, and physical status of the older adult, which cannot be separated.

Abbreviations

ADL
Activities of Daily Living
DASS21
21-item Depression, Anxiety and Stress Scale
FES-I
7-item Falls Efficacy Scale International
FR
Functional Reach
KAP
Keele's Assessment of Participation
CASP12
12-item Control, Autonomy, Self-realization and Pleasure Questionnaire
LNSN-6
Lubben Social Network Scale-6
Lawton IADL
Lawton's Instrumental Activities of Daily Living
PA

Physical Activity
PASE
Physical Activity Scale for the Elderly
TUG
Timed Up and Go
VCAT
Visual Cognitive Assessment Test.

Declarations

Ethics Approval and Consent to Participate

The questionnaire and methodology for this study were performed in accordance with the Declaration of Helsinki and were approved by the University of Malaya Medical Centre Medical Research Ethics Committee (MECID: 2019525-7445) prior to commencement and a subsequent application for amendment to hybrid methods and accelerated approval obtained. Informed consent was obtained from all individual participants included in the study.

Consent for Publication

Patients gave informed consent regarding publishing their data.

Availability of Data and Material

The datasets generated during and/or analysed during the current study are not publicly available due to their containing information that could compromise the privacy of research participants but are available from the corresponding author on reasonable request.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

C.F.L., M.P.T., E.M.K., M.I.Z., N.K., M.M., S.K., N.I.S., and H.M.K. conceived and planned the research. C.F.L., N.H.S., S.M., and S.H.K. carried out the study and completed the data collection. C.F.L. and M.P.T. contributed to the interpretation of the results. C.F.L. took the lead in writing the manuscript. S.R.N., K.M., provided critical feedback and helped to shape the manuscript. C.F.L., N.H.S., S.M., S.H.K., M.P.T., E.M.K., M.I.Z., N.K., M.M., S.K., N.I.S., H.M.K., S.R.N., and K.M. helped shape the research, analysis and manuscript.

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