

Supplementary Note 1. CONSORT 2010 checklist

Section/topic	No	CONSORT 2025 checklist item description	Reported on page no.
Title and abstract			
Title and structured abstract	1a	Identification as a randomised trial	1
	1b	Structured summary of the trial design, methods, results, and conclusions	2
Open science			
Trial registration	2	Name of trial registry, identifying number (with URL) and date of registration	5
Protocol and statistical analysis plan	3	Where the trial protocol and statistical analysis plan can be accessed	5 and 12-13
Data sharing	4	Where and how the individual de-identified participant data (including data dictionary), statistical code and any other materials can be accessed	27
Funding and conflicts of interest	5a	Sources of funding and other support (e.g., supply of drugs), and role of funders in the design, conduct, analysis and reporting of the trial	27
	5b	Financial and other conflicts of interest of the manuscript authors	27
Introduction			
Background and rationale	6	Scientific background and rationale	3-4
Objectives	7	Specific objectives related to benefits and harms	5
Methods			
Patient and public involvement	8	Details of patient or public involvement in the design, conduct and reporting of the trial	5-6
Trial design	9	Description of trial design including type of trial (e.g., parallel group, crossover), allocation ratio, and framework (e.g., superiority, equivalence, non-inferiority, exploratory)	4-5
Changes to trial protocol	10	Important changes to the trial after it commenced including any outcomes or analyses that were not prespecified, with reason	N/A
Trial setting	11	Settings (e.g., community, hospital) and locations (e.g., countries, sites) where the trial was conducted	5
Eligibility criteria	12a	Eligibility criteria for participants	6
	12b	If applicable, eligibility criteria for sites and for individuals delivering the interventions (e.g., surgeons, physiotherapists)	7-8
Intervention and comparator	13	Intervention and comparator with sufficient details to allow replication. If relevant, where additional materials describing the intervention and comparator (e.g., intervention manual) can be accessed	8-10
Outcomes	14	Prespecified primary and secondary outcomes, including the specific measurement variable (e.g., systolic blood pressure), analysis metric (e.g., change from baseline, final value, time to event), method of aggregation (e.g., median, proportion), and time point for each outcome	10-12
Harms	15	How harms were defined and assessed (e.g., systematically, non-systematically)	N/A
Sample size	16a	How sample size was determined, including all assumptions supporting the sample size calculation	6
	16b	Explanation of any interim analyses and stopping guidelines	N/A
Randomisation:			
Sequence generation	17a	Who generated the random allocation sequence and the method used	6
	17b	Type of randomisation and details of any restriction (e.g., stratification, blocking and block size)	5
Allocation concealment mechanism	18	Mechanism used to implement the random allocation sequence (e.g., central computer/telephone; sequentially numbered, opaque, sealed containers), describing any steps to conceal the sequence until interventions were assigned	5

Implementation	19	Whether the personnel who enrolled and those who assigned participants to the interventions had access to the random allocation sequence	6
Blinding	20a	Who was blinded after assignment to interventions (e.g., participants, care providers, outcome assessors, data analysts)	5
	20b	If blinded, how blinding was achieved and description of the similarity of interventions	5
Statistical methods	21a	Statistical methods used to compare groups for primary and secondary outcomes, including harms	12-13
	21b	Definition of who is included in each analysis (e.g., all randomised participants), and in which group	12-13
	21c	How missing data were handled in the analysis	12-13
	21d	Methods for any additional analyses (e.g., subgroup and sensitivity analyses), distinguishing prespecified from post hoc	12-13
Results			
Participant flow, including flow diagram	22a	For each group, the numbers of participants who were randomly assigned, received intended intervention, and were analysed for the primary outcome	13-14
	22b	For each group, losses and exclusions after randomisation, together with reasons	14
Recruitment	23a	Dates defining the periods of recruitment and follow-up for outcomes of benefits and harms	14
	23b	If relevant, why the trial ended or was stopped	NA
Intervention and comparator delivery	24a	Intervention and comparator as they were actually administered (e.g., where appropriate, who delivered the intervention/comparator, how participants adhered, whether they were delivered as intended (fidelity))	18-21
	24b	Concomitant care received during the trial for each group	22-23
Baseline data	25	A table showing baseline demographic and clinical characteristics for each group	29-31
Numbers analysed, outcomes and estimation	26	For each primary and secondary outcome, by group: • the number of participants included in the analysis • the number of participants with available data at the outcome time point • result for each group, and the estimated effect size and its precision (such as 95% confidence interval) • for binary outcomes, presentation of both absolute and relative effect size	14 and 31-34
Harms	27	All harms or unintended events in each group	NA
Ancillary analyses	28	Any other analyses performed, including subgroup and sensitivity analyses, distinguishing pre-specified from post hoc	19-23 and 34
Discussion			
Interpretation	29	Interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence	23-26
Limitations	30	Trial limitations, addressing sources of potential bias, imprecision, generalisability, and, if relevant, multiplicity of analyses	25-26

Citation: Hopewell S, Chan AW, Collins GS, Hróbjartsson A, Moher D, Schulz KF, et al. CONSORT 2025 Statement: updated guideline for reporting randomised trials. BMJ. 2025; 388: e081123.

<https://dx.doi.org/10.1136/bmj-2024-081123>

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*We strongly recommend reading this statement in conjunction with the CONSORT 2025 Explanation and Elaboration and/or the CONSORT 2025 Expanded Checklist for important clarifications on all the items. We also recommend reading relevant CONSORT extensions. See www.consort-spirit.org.

Supplementary Note 2. Interview guide for healthcare providers according to the RE-AIM framework¹

Warm-up questions and background experience

1. What are your responsibilities within the telecare consultation for diabetes patients? Could you describe your workflow when conducting a telecare consultation?
2. Based on your work content and workflow, what are the similarities and differences between in-person visits and online visits?

Reach

3. Are there specific populations that may not be suitable for or benefit from telecare consultation? If so, who are they, and what may be the reasons behind this?

Effectiveness

4. In your opinion, how does telecare compare to in-person consultations in terms of its capabilities and limitations?
5. If there are aspects of the telecare consultation that cannot be addressed, what strategies or alternatives could be employed to overcome these limitations?

Adoption

6. Among the patient population, are there certain individuals who tend to be more resistant to engaging in telecare, and others who are more receptive? What might be the reasons for these attitudes?
7. What strategies do you recommend for reducing resistance and encouraging engagement with telecare among hesitant patients?

Implementation

8. What facilitators can you think of for smoothening the implementation process? Have these facilitators been existed or strengthened at present?
9. What barriers have you encountered during the implementation process? Have these barriers been alleviated or resolved at present?
10. From your perspective, what are the key considerations and steps involved in facilitating a smooth and efficient telecare experience for both healthcare providers and patients?

Maintenance

11. Based on your observations, how does the attrition rate for telecare compare to onsite consultations? Are there specific groups that tend to continue using or drop out of telecare more frequently? What may be the contributing factors to these outcomes?
12. Based on your experience, do you support further implementation or scalability of this telecare program to other settings or patient populations?
13. From the perspective of further implementation, do you have any suggestions for improvements, enhancements, or areas that need additional support?

1. Holtrop JS, Rabin BA, Glasgow RE. Qualitative approaches to use of the RE-AIM framework: rationale and methods. *BMC Health Services Research*. 2018;18(1):177.

Supplementary Note 3. Provider Perspective

From the provider perspective, three categories of cost were included. First, setup costs were collected via a structured questionnaire (see 3a) completed by the Associate Consultant overseeing the telecare program. These included hardware and software (e.g., computers, cameras) and staff time for training, valued using the 2023 Hong Kong Civil Service Master Pay Scale¹ and median weekly working hours. Total setup costs were apportioned across all 67,181 RAMP patients in the NTWC to estimate cost per subject.

Second, ongoing costs encompassed staff time for consultations and administrative tasks, both in telecare and face-to-face modes. Cost data were gathered during the first post-baseline consultation² using a validated and modified RAMP costing tool (see 3b), with staff time recorded through direct observation by a blinded research assistant. These time values were multiplied by corresponding salary rates to estimate unit costs per service, which were then aggregated to calculate per-subject ongoing costs.

Third, health service utilization costs captured the number of GP visits, emergency department attendances, and inpatient stays over the previous three months. These were monetized using published charges for non-eligible persons from the Hong Kong Gazette³ (e.g., HK\$445 per GP visit, HK\$1,230 per A&E attendance, and HK\$5,100 per hospital bed day).

3a. Set up cost of telecare consultation group

	Please indicate the hardware and software additionally required for telecare consultation group Computer: HK\$_____each Camera: HK\$_____each Software: HK\$_____ Maintenance of software: HK\$_____/year Others: Please specify_____; HK\$_____
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2.	Please indicate the number and rank of staff who are involved in the set-up, providing training, and receiving training for telecare consultation. <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">Number of staff</th> <th style="text-align: left; border-bottom: 1px solid black;">Type of staff.</th> <th style="text-align: left; border-bottom: 1px solid black;">Hours spent</th> <th style="text-align: left; border-bottom: 1px solid black;">Salary rate/month</th> </tr> </thead> <tbody> <tr><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td></tr> <tr><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td></tr> <tr><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td></tr> <tr><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td></tr> <tr><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td></tr> <tr><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td></tr> <tr><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td><td style="border-bottom: 1px solid black;">_____</td></tr> </tbody> </table>	Number of staff	Type of staff.	Hours spent	Salary rate/month	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
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3	Are there any other one-off expenses (e.g. infrastructure, materials etc) for setting up telecare consultation group? If yes, please indicate the type of expenses and approximate cost for this type of expenses. <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">Type of expenses</th> <th style="text-align: left; border-bottom: 1px solid black;">Cost</th> </tr> </thead> <tbody> <tr> <td style="border-bottom: 1px solid black;">_____</td> <td style="border-bottom: 1px solid black;">HK\$ _____</td> </tr> <tr> <td style="border-bottom: 1px solid black;">_____</td> <td style="border-bottom: 1px solid black;">HK\$ _____</td> </tr> <tr> <td style="border-bottom: 1px solid black;">_____</td> <td style="border-bottom: 1px solid black;">HK\$ _____</td> </tr> <tr> <td style="border-bottom: 1px solid black;">_____</td> <td style="border-bottom: 1px solid black;">HK\$ _____</td> </tr> </tbody> </table>	Type of expenses	Cost	_____	HK\$ _____	_____	HK\$ _____	_____	HK\$ _____	_____	HK\$ _____																						
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3b. Costing survey

3b-1. Costing survey for face-to-face consultation

Subject number: _____

Date: _____

Subject arrival time: _____: _____ a.m./ p.m.

Subject departure time: _____: _____ a.m./ p.m.

Doctor consultation - Staff involved and time spent in the clinic

Yes/No	Type of Intervention	Number of Staff involved	Start Time	End Time
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	Face-to-face consultation ☐ Taking temperature ☐ Registration ☐ Basic exam ☐ Consultation ☐ Others _____	_____ PCA/HCA _____ Clinical clerk _____ Doctor		
	Telecare consultation ☐ Phone confirmation before consultation ☐ Basic exam ☐ Consultation ☐ Others _____	_____ clinical clerk _____ PCA _____ Doctor _____		

Multidisciplinary team intervention - Staff involved and time spent in the clinic

	Type of Intervention	Number of Staff involved	Start Time	End Time
Nurse assessment	☐ Face-to-face ☐ Taking temperature ☐ Registration ☐ Basic exam ☐ Blood taking ☐ Foot assessment ☐ Eye assessment ☐ Review results ☐ Others _____	_____ PCA/HCA _____ Clinical clerk _____ PCA _____ PCA _____ APN _____ APN _____ RN; _____ APN _____		
	☐ Telecare ☐ Phone confirmation before consultation ☐ Basic exam ☐ Review results ☐ Others _____	_____ Clinical clerk _____ PCA _____ RN; _____ APN _____		
Nurse intervention	☐ Face-to-face ☐ Taking temperature ☐ Registration ☐ Basic exam ☐ Consultation ☐ Others _____	_____ PCA/HCA _____ Clinical clerk _____ PCA _____ APN _____		

	☐ Telecare ☐ Phone confirmation before consultation ☐ Basic exam ☐ Consultation ☐ Others _____	_____ Clinical clerk _____ PCA _____ APN _____		
Dietician intervention	☐ Face-to-face ☐ Taking temperature ☐ Registration ☐ Basic exam ☐ Consultation ☐ Others _____	_____ PCA/HCA _____ Clinical clerk _____ PCA _____ Dietician _____		
	☐ Telecare ☐ Phone confirmation before consultation ☐ Basic exam ☐ Consultation ☐ Others _____	_____ Clinical clerk _____ PCA _____ Dietician _____		
Physiotherapy	☐ Face-to-face ☐ Taking temperature ☐ Registration ☐ Basic exam ☐ Consultation ☐ Others _____	_____ PCA/HCA _____ Clinical clerk _____ PCA _____ Physiotherapist _____		
	☐ Telecare ☐ Phone confirmation before consultation ☐ Basic exam ☐ Consultation ☐ Others _____	_____ Clinical clerk _____ PCA _____ Physiotherapist _____		
Others	_____ _____ _____	_____ _____ _____		

Abbreviations: AC, Associate Consultant; APN, Advanced Practice Nurse; PCA, Patient Care Assistant

3b-2. Costing survey for telecare consultation

Subject number: _____ Date: _____

Session **START** time: _____: _____ a.m./ p.m. Session **END** time: _____: _____ a.m./ p.m.

Total waiting time: [= Total time used (__: __) – intervention time (__: __)] = __: __

Doctor consultation - Staff involved and time spent in the clinic

Type of Intervention	Number of Staff involve (Circle staff involved) *	Start Time	End Time
☐ Phone confirmation before consultation ☐ Basic exam ☐ Consultation ☐ Others _____ ☐ Others _____ ☐ Others _____	_____ Clinical clerk _____ (PCA/HCA; RN; APN; Doctor) * _____ Doctor _____ (Clinical clerk; PCA/HCA; RN; APN; Doctor) * _____ (Clinical clerk; PCA/HCA; RN; APN; Doctor) * _____ (Clinical clerk; PCA/HCA; RN; APN; Doctor) *		

Nurse assessment - Staff involved and time spent in the clinic

Type of Intervention	Number of Staff involved (Circle staff involved) *	Start Time	End Time
☐ Phone confirmation before consultation ☐ Basic exam ☐ Review results ☐ Others _____ ☐ Others _____ ☐ Others _____	_____ Clinical clerk _____ (PCA/HCA; RN; APN) * _____ RN; _____ APN _____ (Clinical clerk; PCA/HCA; RN; APN) * _____ (Clinical clerk; PCA/HCA; RN; APN) * _____ (Clinical clerk; PCA/HCA; RN; APN) *		

Multidisciplinary Intervention - Staff involved and time spent in the clinic

Type of Intervention	Number of Staff involved (Circle staff involved) *	Start Time	End Time
Nurse intervention			
☐ Phone confirmation before consultation ☐ Basic exam ☐ Consultation ☐ Others _____ ☐ Others _____	_____ Clinical clerk _____ PCA _____ APN _____ (Clinical clerk; PCA/HCA; RN; APN) * _____ (Clinical clerk; PCA/HCA; RN; APN) *		
Dietician intervention			

☐ Phone confirmation before consultation ☐ Basic exam ☐ Consultation ☐ Others _____ ☐ Others _____	_____ Clinical clerk _____ PCA _____ Dietician _____ (Clinical clerk; PCA/HCA; RN; Dietician) * _____ (Clinical clerk; PCA/HCA; RN; Dietician) *		
Physiotherapy			
☐ Phone confirmation before consultation ☐ Basic exam ☐ Consultation ☐ Others _____ ☐ Others _____	_____ Clinical clerk _____ PCA _____ Physiotherapist _____ (Clinical clerk; PCA/HCA; RN; Physiotherapist) * _____ (Clinical clerk; PCA/HCA; RN; Physiotherapist) *		
Other Healthcare Professional (_____)			
_____ _____ _____	_____ (Staff: _____) _____ (Staff: _____) _____ (Staff: _____)		

Abbreviations: AC, Associate Consultant; APN, Advanced Practice Nurse; PCA, Patient Care Assistant; HCA, Health care assistant

1. Glasgow RE, Vogt TM, Boles SM. Evaluating the public health impact of health promotion interventions: the RE-AIM framework. *Am J Public Health*. 1999;89(9):1322-7.
2. Long AN, Dagogo-Jack S. Comorbidities of Diabetes and Hypertension: Mechanisms and Approach to Target Organ Protection. *The Journal of Clinical Hypertension*. 2011;13(4):244-51.
3. Fung S, Tsui E, Fong D, Dai D, Lam C, editors. In-depth cost-effectiveness study of the multidisciplinary risk factor assessment and management programme (RAMP) of the Hospital Authority. *Health Research Symposium*; 2014: Food and Health Bureau, HKSAR.

Supplementary Note 4. Societal perspective

From the societal perspective, patient-incurred costs were also included, covering both out-of-pocket expenses (e.g., travel) and time costs for patients and their companions. These data were collected using a modified RAMP patient cost questionnaire administered through in-person or video interviews immediately following the first consultation. Time costs were calculated by multiplying reported time by the 2023 median Hong Kong monthly salary (HK\$20,700). All cost data were collected by trained research staff to minimize bias. This comprehensive cost evaluation allowed for assessment of the program's financial sustainability and informed future scalability within the public primary care system.

4a. Survey for face-to-face consultation

Subject number: _____

Date: _____

Subject arrival time: _____: _____ a.m./ p.m.

Subject departure time: _____: _____ a.m./ p.m.

1. How much did you pay to attend this RAMP-DM clinic visit?

Co-payment: \$_____ for this visit

2. What type of transportation did you take to attend this RAMP-DM clinic visit? How much was it? How long did you travel? Will it be the same for the return journey? If not, please give details. Did you have any accompanying person?

To RAMP-DM clinic			Same for return journey? Yes / No (circle one) If no, state below:	
Type of transportation	Cost	Travel time	Cost	Travel time
☐ Public transport (e.g. bus, minibus, MTR, tram)	\$	mins	\$	mins
☐ Taxi	\$	mins	\$	mins
☐ Walking	-	mins	-	mins
☐ Private car	\$	mins	\$	mins
☐ Others _____	\$	mins	\$	mins
Total	\$	mins	\$	mins
Accompanying person		Yes, how many _____ / No		

4b. Survey for telecare consultation

Subject number: _____

Date: _____

Start time: _____: _____

End time: _____: _____

1. In the telecare consultation, how long did you spend for a whole consultation? How long did you spend with the doctor in the consultation? Did you normally see any other health care staff, e.g. nurse, during the consultation?

	Time spent
☐ Preparation	mins/ hours
☐ Doctor	mins/ hours
☐ Nurse	mins/ hours
☐ Others _____	mins/ hours
Total time spent	mins/ hours

2. Did you have any accompanying person?

☐ Yes, how many _____☐ No

3. Did you / any person on behalf of you attend the clinic on the same / other day to obtain medicine?

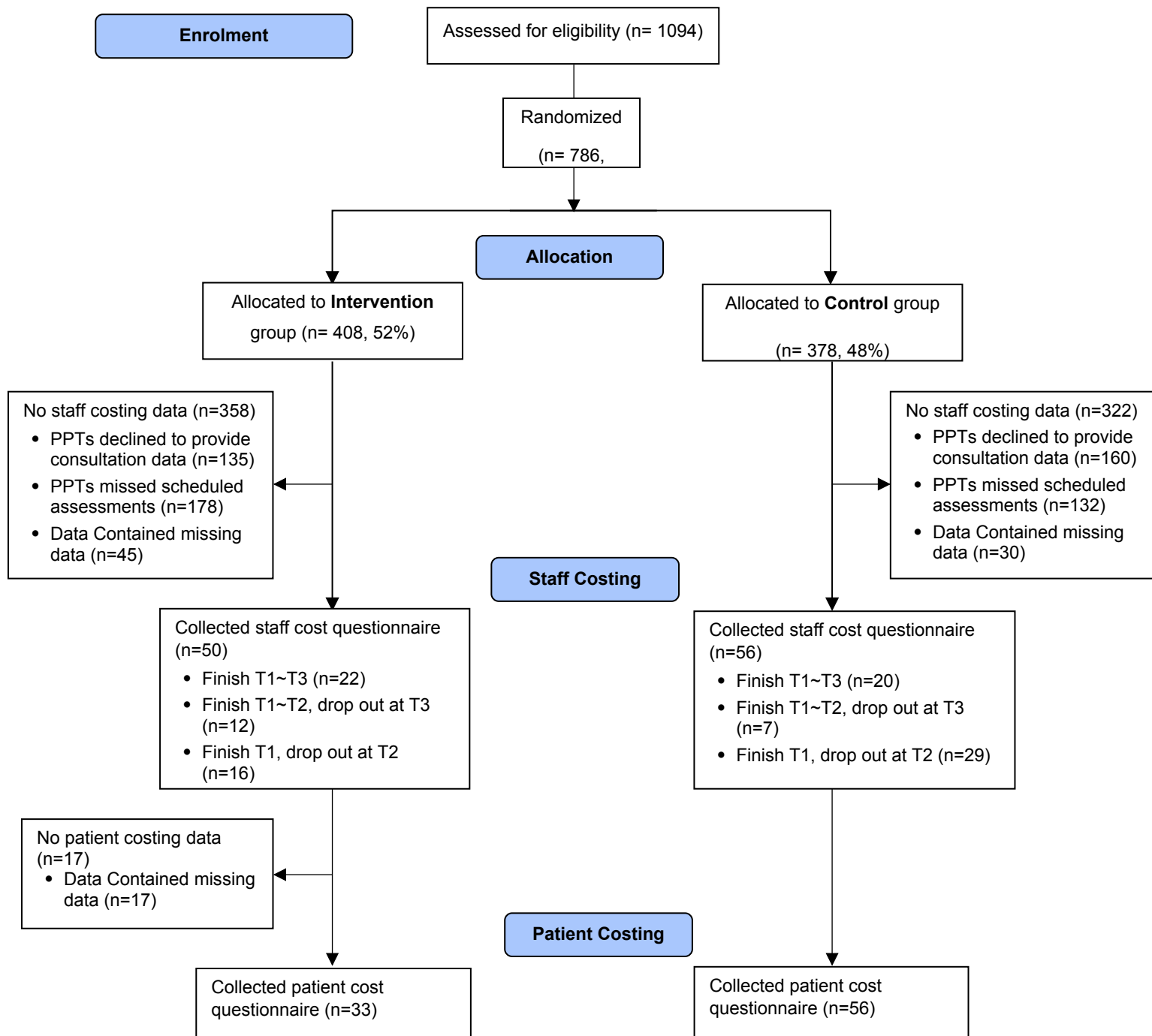
☐ Yes, total time spent _____ mins/ hours☐ No

4. What was the type of transportation, one-way travelling cost and time spent on one-way travelling to obtain medicine? Did you have any accompanying person?

Type of transportation: _____; Cost: HK\$ _____

Time spent: _____ mins/ hours; Accompanying person _____

Supplementary Note 5. Flowchart of cost data collection



Supplementary Table 1. Intention-to-treat intervention effects at T1, T2, and T3 on all effectiveness outcomes in GEE model

Variables			β	95% CI	Wald χ^2	<i>p</i>
HbA1c (%)	Between group effect		-0.028	(-0.171, 0.115)	0.145	0.703
	Within group effect	T2 vs T1	-0.056	(-0.150, 0.039)	1.324	0.250
		T3 vs T1	0.018	(-0.088, 0.125)	0.113	0.737
	Group*Time interaction effect	Group*T2 vs T1	0.080	(-0.064, 0.213)	1.383	0.240
		Group*T3 vs T1	0.082	(-0.053, 0.228)	1.206	0.272
Lipid profile (mmol/L) - LDL	Between group effect		-0.101	(-0.189, -0.013)	5.070	0.024
	Within group effect	T2 vs T1	-0.117	(-0.182, -0.052)	12.358	<0.001
		T3 vs T1	-0.121	(-0.182, -0.059)	14.561	<0.001
	Group*Time interaction effect	Group*T2 vs T1	0.121	(0.030, 0.212)	6.832	0.009
		Group*T3 vs T1	0.089	(0.006, 0.172)	4.407	0.036
Lipid profile (mmol/L) - HDL	Between group effect		-0.017	(-0.066, 0.033)	0.434	0.510
	Within group effect	T2 vs T1	-0.004	(-0.024, 0.016)	0.128	0.720
		T3 vs T1	0.025	(0.002, 0.047)	4.662	0.031
	Group*Time interaction effect	Group*T2 vs T1	0.023	(-0.005, 0.051)	2.681	0.102
		Group*T3 vs T1	0.011	(-0.018, 0.040)	0.540	0.463
Lipid profile (mmol/L) - TG	Between group effect		-0.036	(-0.143, 0.072)	0.419	0.517
	Within group effect	T2 vs T1	-0.026	(-0.102, 0.049)	0.473	0.492
		T3 vs T1	0.109	(0.027, 0.192)	6.752	0.009
	Group*Time interaction effect	Group*T2 vs T1	0.067	(-0.049, 0.182)	1.283	0.257
		Group*T3 vs T1	0.054	(-0.071, 0.179)	0.717	0.397
Blood pressure (mm/Hg) - SBP	Between group effect		-5.988	(-8.075, -3.901)	31.629	<0.001
	Within group effect	T2 vs T1	-1.454	(-3.594, 0.685)	1.776	0.183
		T3 vs T1	-0.585	(-3.006, 1.836)	0.224	0.636
	Group*Time interaction effect	Group*T2 vs T1	1.268	(-1.626, 4.161)	0.737	0.391
		Group*T3 vs T1	2.990	(-0.214, 6.194)	3.346	0.067
Blood pressure (mm/Hg) - DBP	Between group effect		-1.929	(-3.491, -0.367)	5.862	0.015
	Within group effect	T2 vs T1	-3.364	(-5.008, -1.720)	16.086	<0.001
		T3 vs T1	-3.915	(-4.703, -3.128)	94.909	<0.001
	Group*Time interaction effect	Group*T2 vs T1	0.783	(-1.456, 3.022)	0.470	0.493
		Group*T3 vs T1	1.252	(0.125, 2.378)	4.745	0.029
SF-12 PCS	Between group effect		0.353	(-0.770, 1.477)	0.380	0.538
	Within group effect	T2 vs T1	-2.125	(-3.157, -1.093)	16.298	<0.001
		T3 vs T1	-1.427	(-2.434, -0.420)	7.716	0.005
	Group*Time interaction effect	Group*T2 vs T1	-0.574	(-1.921, 0.773)	0.697	0.404
		Group*T3 vs T1	-0.423	(-1.811, 0.965)	0.357	0.550
SF-12 MCS	Between group effect		0.549	(-0.644, 1.743)	0.814	0.367
	Within group effect	T2 vs T1	-6.455	(-7.347, -5.562)	200.933	<.001
		T3 vs T1	-5.619	(-6.580, -4.658)	131.362	<.001
	Group*Time interaction effect	Group*T2 vs T1	0.265	(-0.956, 1.487)	0.181	0.670
		Group*T3 vs T1	-0.929	(-2.172, 0.313)	2.149	0.143

ARMS - Medication Adherence	Between group effect		0.120	(-0.190, 0.430)	0.572	0.449
	Within group effect	T2 vs T1	-0.325	(-0.580, -0.070)	6.224	0.013
		T3 vs T1	-0.406	(-0.670, -0.142)	9.101	0.003
	Group*Time interaction effect	Group*T2 vs T1	-0.176	(-0.538, 0.186)	0.908	0.341
		Group*T3 vs T1	0.083	(-0.463, 0.297)	0.183	0.669
ARMS - Medication Rill	Between group effect		0.142	(-0.094, 0.378)	1.399	0.239
	Within group effect	T2 vs T1	-1.556	(-1.765, -1.346)	171.354	<0.001
		T3 vs T1	-1.510	(-1.738, -1.281)	184.382	<0.001
	Group*Time interaction effect	Group*T2 vs T1	-0.035	(-0.326, 0.256)	0.048	0.814
		Group*T3 vs T1	0.096	(-0.402, 0.209)	2.902	0.536
ARMS - Overall Score	Between group effect		0.259	(-0.156, 0.675)	1.435	0.221
	Within group effect	T2 vs T1	-1.880	(-2.213, -1.547)	94.792	<0.001
		T3 vs T1	-2.915	(-2.311, -1.529)	83.093	<0.001
	Group*Time interaction effect	Group*T2 vs T1	-0.209	(-0.675, 0.256)	0.337	0.378
		Group*T3 vs T1	0.177	(-0.725, 0.370)	1.562	0.525
SDSCA - Medication	Between group effect		0.137	(0.042, 0.231)	7.990	0.005
	Within group effect	T2 vs T1	-0.467	(-0.598, 0.336)	48.619	<0.001
		T3 vs T1	-0.003	(-0.096, 0.091)	0.003	0.958
	Group*Time interaction effect	Group*T2 vs T1	-0.069	(-0.233, 0.094)	0.692	0.406
		Group*T3 vs T1	-0.204	(-0.330, -0.078)	10.021	0.002
SDSCA - Diet	Between group effect		0.024	(-0.245, 0.293)	0.031	0.859
	Within group effect	T2 vs T1	0.380	(0.188, 0.571)	15.133	<0.001
		T3 vs T1	0.812	(0.632, 0.992)	78.237	<0.001
	Group*Time interaction effect	Group*T2 vs T1	0.069	(-0.191, 0.329)	0.270	0.603
		Group*T3 vs T1	-0.219	(-0.462, -0.024)	3.114	0.078
SDSCA - Exercise	Between group effect		-0.272	(-0.550, 0.007)	3.660	0.056
	Within group effect	T2 vs T1	0.020	(-0.182, 0.221)	0.037	0.847
		T3 vs T1	-0.213	(-0.395, -0.031)	5.270	0.022
	Group*Time interaction effect	Group*T2 vs T1	-0.144	(-0.410, 0.122)	1.121	0.290
		Group*T3 vs T1	0.137	(-0.105, 0.379)	1.232	0.267
SDSCA - Blood Sugar Test	Between group effect		0.159	(-0.113, 0.431)	1.313	0.252
	Within group effect	T2 vs T1	-0.032	(-0.196, 0.133)	0.142	0.706
		T3 vs T1	0.237	(0.056, 0.417)	6.613	0.010
	Group*Time interaction effect	Group*T2 vs T1	-0.143	(-0.388, 0.102)	1.300	0.254
		Group*T3 vs T1	-0.323	(-0.556, -0.090)	7.386	0.007
SDSCA - Foot Care	Between group effect		0.332	(-0.039, 0.682)	3.056	0.080
	Within group effect	T2 vs T1	0.811	(0.547, 1.074)	36.354	<0.001
		T3 vs T1	1.402	(1.168, 1.626)	138.408	<0.001
	Group*Time interaction effect	Group*T2 vs T1	-0.018	(-0.377, 0.340)	0.010	0.921
		Group*T3 vs T1	-0.515	(-0.824, -0.206)	10.661	0.001
Non arrange Private GP	Between group effect		-0.025	(-0.158, 0.107)	0.141	0.707
	Within group effect	T2 vs T1	0.188	(0.056, 0.320)	7.772	0.005
		T3 vs T1	0.367	(0.236, 0.498)	30.097	<0.001
	Group*Time	Group*T2 vs T1	-0.054	(-0.222, 0.114)	0.399	0.528

	interaction effect	Group*T3 vs T1	-0.078	(-0.368, 0.112)	0.646	0.421
Arrange public GP	Between group effect		-0.025	(-0.158, 0.107)	0.141	0.707
	Within group effect	T2 vs T1	0.188	(0.056, 0.320)	7.772	0.005
		T3 vs T1	0.367	(0.236, 0.498)	30.097	<0.001
	Group*Time interaction effect	Group*T2 vs T1	-0.054	(-0.222, 0.114)	0.399	0.528
		Group*T3 vs T1	-0.078	(-0.368, 0.112)	0.646	0.421
Non arrange public GP	Between group effect		-0.213	(-0.365, -0.061)	7.540	0.006
	Within group effect	T2 vs T1	-0.455	(-0.579, -0.331)	51.894	<0.001
		T3 vs T1	-0.453	(-0.574, -0.331)	53.413	<0.001
	Group*Time interaction effect	Group*T2 vs T1	0.172	(0.021, 0.324)	4.972	0.026
		Group*T3 vs T1	0.187	(0.040, 0.335)	6.202	0.013
AE visit	Between group effect		-0.014	(-0.088, 0.059)	0.148	0.700
	Within group effect	T2 vs T1	-0.119	(-0.177, -0.060)	15.653	<0.001
		T3 vs T1	-0.128	(-0.183, -0.073)	20.525	<0.001
	Group*Time interaction effect	Group*T2 vs T1	0.002	(-0.082, 0.077)	0.003	0.956
		Group*T3 vs T1	0.010	(-0.067, 0.086)	0.059	0.808
Inpatient	Between group effect		-0.019	(-0.097, 0.059)	0.234	0.628
	Within group effect	T2 vs T1	-0.060	(-0.130, 0.011)	2.753	0.097
		T3 vs T1	-0.081	(-0.152, -0.010)	4.980	0.026
	Group*Time interaction effect	Group*T2 vs T1	0.027	(-0.116, 0.062)	0.348	0.555
		Group*T3 vs T1	-0.010	(-0.095, 0.076)	0.047	0.828
Inpatient Day	Between group effect		-0.233	(-0.730, 0.264)	0.842	0.359
	Within group effect	T2 vs T1	-0.384	(-0.867, 0.098)	2.435	0.119
		T3 vs T1	-0.489	(-0.948, -0.029)	4.344	0.037
	Group*Time interaction effect	Group*T2 vs T1	0.178	(-0.364, 0.719)	0.414	0.520
		Group*T3 vs T1	0.220	(-0.278, 0.726)	0.767	0.381

* β coefficients are interpreted relative to the control group at baseline (T1); positive values indicate higher outcomes in the intervention group.

Supplementary Table 2. Non-inferiority test for the HbA1c using Independent-Samples t-test

IG Mean (%)	CG Mean (%)	Mean Difference (I G-CG)	One-Sided 95% CI (Upper Bound)	Non-Inferiority Margin	Conclusion
7.08	6.96	0.098	0.031	0.40	Non-inferior

Supplementary Table 3. Thematic analysis results on facilitators and barriers and Theoretical Domains Framework (TDF) mapping¹

Themes and codes	TDF source
<i>Facilitators</i>	
Effective Management and Multifaced Support	
Organizational adjustments and workflow arrangements	1, 2, 10, 11, 12, 14
Multistakeholder support (family, community, government)	11, 12
Proactive promotion through media and materials	1, 12
Comprehensive training and guidance	
Tailored training and support for patients	1, 2, 11
Structured training and upskilling for staff	2, 11
Perceived convenience and continuity of care	
Convenience in accessing care and reducing travel	6, 7
Suggestions for integrating medication delivery to enhance continuity	6, 11
Openness to technology and digital skills	
Patient and staff digital literacy and confidence	2, 4, 8, 12
Positive perceptions of telecare and future virtual care	5, 6, 8
Positive Impacts during the COVID-19	
Prior staff training and experience during the pandemic	1, 12
Familiarity among patients from previous telecare use	1, 6, 12
Infrastructure established during COVID-19	11
Reliable infrastructure and technical support	
Availability of well-developed, user-friendly technology	11
Technically prepared facilities supporting smooth operations	11
<i>Barriers</i>	
Limited Digital Literacy and Reluctance to Change	
Patients' lack of digital skills and confidence	1, 2, 3, 6, 10
Negative perceptions and concerns (e.g., scams, complexity)	1, 6, 8, 13
Preference for in-person care and difficulty adjusting to virtual models	1, 6, 10, 13
Inadequate services	
Inability to perform physical examination	9
Limited-service benefits (e.g., no sick leave notes, medication delivery)	3, 6, 9, 11
Reduced perceived value among patients	8
Environmental and Technological Challenges	
Platform compatibility and e-payment difficulties	2, 3, 11
Inappropriate environments for video consultations (e.g., privacy issues)	6, 11
Operational Challenges and Staff Capacity Constraints	
Inefficient workflows and connection setup delays	11
Limited manpower and excessive workload	11
Lack of formal technical support or training in clinics	1, 11

1. Cane J, O'Connor D, Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implementation Science*. 2012;7(1):37.

Supplementary Table 4. Illustrated quotes of facilitators and barriers

Theme	Code	Quote
Facilitators		
Effective Management and Multifaceted Support	Organizational adjustments and workflow arrangements	<i>"I think that the senior management should have monthly meetings involving doctors and nurses, at least these two crucial parties... This provides an opportunity for communication regarding operational matters. As frontline staff, we can share our opinions, such as feedback on using telecare, with our clinic in-charge." (D02)</i>
	Multistakeholder support (family, community, government)	<i>"For example, many patients live in housing estates or public housing estates, and in some areas, there are centres that can assist them with telecare." (WM03)</i>
	Proactive promotion through media and materials	<i>"For promotion, perhaps considering advertising on television would help. Although people have heard about video consultations during the pandemic, they may think it's only temporary. So, it may be necessary to seek government assistance and promote it on television to provide more information to the public." (C04)</i>
Comprehensive training and guidance	Tailored training and support for patients	<i>"Education for patients is also important. Not every condition is suitable for video consultations. For example, diabetes may be suitable, but if a patient has new symptoms like chest pain or shortness of breath, those situations require physical examinations during the in-person consultation. So, we need to educate patients that video may not always be the solution, and when their condition worsens, they should seek in-person consultations." (D05)</i>
	Structured training and upskilling for staff	<i>"I feel that IT support is important for our staff because it is a gradual learning process. Not all of our administrative staff are familiar with IT-related matters, and we have trained our colleagues to assist patients by providing guidance on how to use telecare." (APN05)</i>
Perceived convenience and continuity of care	Convenience in accessing care and reducing travel	<i>"Once they overcome those challenges, they find the service convenient and appreciate the flexibility it offers in terms of time." (D01)</i>
	Suggestions for integrating medication delivery to enhance continuity	<i>"To make it smoother, medicine delivery services would help... If we can implement it soon, I believe remote medical services will become more popular." (C04)</i>
Openness to technology and digital skills	Patient and staff digital literacy and confidence	<i>"It depends on the patient's familiarity and proficiency with technology. If they have the ability and willingness, or if there is someone to support and assist them..." (D06)</i>
	Positive perceptions of telecare and future virtual care	<i>"We will definitely sustain it. I believe the goal is not just to maintain it, but to develop it further. The hospital authority seems to be supportive, and patients welcome it as well. I feel that the direction mentioned earlier—specifically, to digitalize everything, especially the medication delivery aspect—will ensure that sustainability and development are not issues." (D08)</i>
Positive Impacts during the COVID-19	Prior staff training and experience during the pandemic	<i>"Because our clinic has previously been designated as a telecare clinic with video consultation services, our colleagues are already familiar with it." (APN04)</i>
	Familiarity among patients from previous telecare use	<i>"The online consultation experience that most people had during COVID has accelerated the popularization of this approach. Many patients have already tried online consultations, but at that time, we used Zoom; now we are using HA GO." (D09)</i>

	Infrastructure established during COVID-19	<i>"Actually, when we started doing online consultations at the designated clinic during COVID, we already had some setup in place, including monitors, iPads, and cameras. We have been using that setup and made some adjustments to adapt it to the current configuration." (APN01)</i>
Reliable infrastructure and technical support	Availability of well-developed, user-friendly technology	<i>"The interface of the HA GO platform is user-friendly... It is easy to communicate what actions to take, such as adjusting the camera or muting the audio. These aspects are well-implemented." (C02)</i>
	Technically prepared facilities supporting smooth operations	<i>"In terms of hardware, there have also been improvements. Our electronic devices and internet equipment have been optimized. The Wi-Fi has been enhanced, and interruptions during online sessions have significantly decreased. This improvement has increased my willingness to engage in video consultations." (APN04)</i>
Barriers		
Limited Digital Literacy and Reluctance to Change	Patients' lack of digital skills and confidence	<i>"After recruiting them, it's easy to explain things briefly, but once they go back home and come for a follow-up appointment after a few months, they often forget how to use... It's challenging for them, even if we explain it well to them now, they might forget when they return home. They might not remember how to log in or that it's not an in-person appointment but a remote one over the phone." (APN02)</i>
	Negative perceptions and concerns (e.g., scams, complexity)	<i>"There are patients who are unfamiliar with online consultations and have concerns, particularly about identity verification and using payment apps to pay for consultation fees. They may question the legitimacy of video consultations and whether there are any associated risks." (APN05)</i>
	Preference for in-person care and difficulty adjusting to virtual models	<i>"They preferred coming in person because they felt more comfortable seeing us face-to-face. They appreciate the personal interaction, especially the elderly patients. Some patients even mentioned that they preferred coming in person to see the doctor." (APN01)</i>
Inadequate services	Inability to perform physical examination	<i>"There are also some patients who feel that their condition is unstable, or some patients who are very concerned about their physical condition or changes, and they would like to have a physical check-up every time. Because just like our initial procedure, every time they come to the follow-up consultation and we poke their finger, the patients have a great response. Now they may feel, 'I don't have to come back to clinic, you don't have my blood pressure measured, and you don't see me, and the doctor doesn't do a check-up for me.'" (APN05)</i>
	Limited-service benefits (e.g., no sick leave notes, medication delivery)	<i>"The only issue is that after the telecare consultation, patients need to return to collect their medication. Currently, we haven't implemented a system for home delivery, so they must come in person or find someone to pick it up for them. Some patients may wonder why they need to come for their medication even after a telecare consultation. Improving this aspect of the service would be beneficial." (D03)</i>
	Reduced perceived value among patients	<i>"When communicating through telecommunication, whether it's on a monitor or a mobile phone, they feel it's somewhat... impersonal. For example, if I want to say a few more words, the doctor may say, 'Oh, I don't have time for that.' But when it's a face-to-face interaction, they can do some physical exams and address other complaints all at once." (APN01)</i>
Environmental and Technological Challenges	Platform compatibility and e-payment difficulties	<i>"When they hear about so many different types of E-payment, they have some resistance... The problem is that it requires an app, and it's a bit difficult to handle. The feedback they gave me was that as soon as they entered the E-payment area, they didn't know how to operate it. So, they couldn't handle the E-payment, and as a result, they couldn't do anything else afterwards." (APN01)</i>

	Inappropriate environments for video consultations (e.g., privacy issues)	<i>“There may be situations where the environment isn’t ideal, especially when privacy is compromised... like when I hear other voices in the background and can’t be sure if it’s their home.” (D06)</i>
Operational Challenges and Staff Capacity Constraints	Inefficient workflows and connection setup delays	<i>“Sometimes video consultations are not ideal because you may spend 10 minutes just guiding the patient... The challenge lies in finding the patient.” (D05)</i>
	Limited manpower and excessive workload	<i>“But in reality, we have always been short of staff, so even if we have more video patients, we might not be able to support them.” (WM02)</i>
	Lack of formal technical support or training in clinics	<i>“As clerks, we are not familiar with all the different models of mobile phones. We are not IT experts. We assist them based on our knowledge of the devices they use. If there are operational issues, we also need support because we haven’t received formal training on how to support this. We simply downloaded the program and tried it out, so we can help patients with what we know.” (C05)</i>

Abbreviations: D - Doctor, WM - Ward Manager, APN - Advanced Practice Nurse, C – Clerk

Supplementary Table 5. Implementation determinants and TDF belief statements¹

Theoretical domains	Definition	Implementation determinants and belief statements
Knowledge	An awareness of the existence of something	+ Comprehensive understanding of telecare processes, relevant knowledge, and necessary precautions among both staff and patients + Enhanced promotion efforts to increase public awareness of telecare – Patients’ lack of familiarity with relevant knowledge and information regarding telecare
Skills	An ability or proficiency acquired through practice	+ High level of IT skills and proficiency with telecare applications among both staff and patients + Provision of hands-on IT and technology training necessary for telecare, targeting both staff and patients – Patients’ insufficient proficiency with digital technologies necessary for telecare sessions (e.g., operating apps, e-payment systems)
Social/Professional Role and Identity	A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting	– Senior citizens generally possess lower levels of IT literacy, resulting in difficulties in utilizing telecare services – The working population refuses to use telecare due to the inability to take sick leave through telecare platforms
Beliefs about Capabilities	Acceptance of the truth, reality, or validity about an ability, talent, or facility that a person can put to constructive use	+ Patients’ confidence in their ability to manage any issues that may arise during telecare sessions
Optimism	The confidence that things will happen for the best or that desired goals will be attained	+ Expressing optimistic views regarding the long-term potential of virtual care, telecare, and digital health technologies
Beliefs about Consequences	Acceptance of the truth, reality, or validity about outcomes of a behaviour in a given situation	– Patients’ concerns about risks and potential scams associated with telecare – Patients’ perception that telecare is bothersome
Reinforcement	Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus	+ Positive interactions and support received from telecare may increase patients’ motivation to continue engaging in telecare
Intentions	A conscious decision to perform a behaviour or a resolve to act in a certain way	+ Having intentions to promote and support the implementation of telecare
Goals	Mental representations of outcomes or end states that an individual wants to achieve	– Telecare is unable to fulfil patients’ requirements for physical examinations

Memory, Attention and Decision Processes	The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives	+ Establishing designated sessions in the clinic for telecare ensures staff's focused attention during consultations and reduces transition time between switching from in-person to online modes – Patients' preference for in-person consultations over telecare – Patients forget their telecare appointments as well as the usage methods of telecare
Environmental Context and Resources	Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behaviour	+ Arranging designated IT training sessions for staff and patients + Arranging regular meetings with healthcare professionals at the clinic level + Establishing designated sessions for telecare consultations, including specific work hours and staff who focus on telecare + Enhancing and increasing human resource allocation, especially for clerical staff + Multifaceted support from multiple stakeholders (community, society, government, and Hospital Authority) + Well-equipped facilities and infrastructure for telecare + Well-designed app and functions for telecare – Insufficient manpower at the clinic – Challenges posed by external e-payment systems – Inadequate services, such as the lack of medication delivery – Poor IT and technology conditions among patients – Intricate and time-consuming telecare procedures (connecting and identity verification) – Unsuitable environment for telecare
Social Influences	Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviours	+ Active promotion and advancement of telecare by various stakeholders + Social support within families, with younger individuals assisting the senior generation. + Experience with telecare during COVID-19 helped staff accumulate relevant knowledge and skills. + Experience with telecare during COVID-19 increased public familiarity and awareness of telecare as an emerging healthcare model
Emotion	A complex reaction pattern, involving experiential, behavioural, and physiological elements, by which the individual attempts to deal with a personally significant matter or event	– Patients exhibit resistance to telecare, perceiving it as impersonal and uncaring
Behavioural regulation	Anything aimed at managing or changing objectively observed or measured actions	+ Establishing standardized working regulations and workflows

Note: In the column labelled "Implementation determinants and belief statements," items marked with a "+" represent facilitators, while items marked with a "–" represent barriers.

1. Cane J, O'Connor D, Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implementation Science*. 2012;7(1):37.

Supplementary Table 6. Set up costs for telecare

	Number	Unit cost (HK\$)	Total cost (HK\$)
Equipment			
iPad	21	2394.0	50274.0
iPad stand	21	240.0	5040.0
Speakerphone	21	771.0	16191.0
Hourly pay			
	Number	Hourly pay (HK\$)	Total cost (HK\$)
Pre-programme training (one hour)			
Associate consultant	7	1034.6	7241.9
APN	8	473.7	3789.2
Clerk / EAII	14	126.1	1764.9
Total set up cost *			84301.0
Set up cost per RAMP patient †			1.3

Abbreviations: APN, Advanced Practice Nurse; EA, Executive Assistant

* Costs for the system/platform required to perform telecare were not included in this estimation because existing platform available from HAHO (for all HA clusters)

† Average cost per RAMP patient was based on the total number RAMP patients (67181) in the 7 clinics from the NTWC

Narrative Summary

The setup costs for telecare in the intervention group are shown in the table. The hardware required to deliver telecare consultations included three sets of devices (iPad, iPad stand and speakerphone) for all seven clinics in the NTWC, giving a total cost of HK\$71,505. No extra software cost was considered in the telecare, as telecare consultations were delivered through the existing HAHO platform available to all HA clusters. Pre-programme training costs included a one-hour training session for seven associate consultants, eight advanced practice nurses, and 14 clerical and administrative staffs, with a total cost of HK\$12,796. The total setup cost was estimated to be HK\$84,301, with set up cost per patient at HK\$1.3.

Supplementary Table 7. Staff time cost per component in the telecare consultation in the intervention group (N=50)

	Average total time spent (mins)	Range (mins)	Provider (salary per mins, HK\$)	Time cost per component (HK\$)
Telecare consultation				
Nurse consultation				
Phone confirmation	7.2	5 – 13	Clerk (2.6)	18.7
Basic examination	5.0	5 – 5	APN (6.0)/ Doctor (11.6)	57.9
Consultation	15.2	14 – 17	APN (6.0)	90.6
AC consultation				
Phone confirmation	7.0*	2 – 95	Clerk (2.6)	18.2
Basic examination	5.0	5 – 5	Doctor (11.6)	57.9
Consultation	8.3	3 – 22	Doctor (11.6)	96.4
Other				
Booking next appointment	5.1	1 – 10	Clerk (2.6)	13.2
Reminding for blood taking/ specimen	7.5	5 – 10	PCA (1.8)	13.4
Reminding for collect documents	9.2	5 – 10	Clerk (2.6)	23.8
Other inquiries 1	7.6	4 – 16	Clerk (2.6)	19.6
Other inquiries 2	16.0	13 – 20	APN (6.0)	95.4

Abbreviations: AC, Associate Consultant; APN, Advanced Practice Nurse; PCA, Patient Care Assistant

* Based on median due to outliers

Narrative Summary

The on-going staff time cost in telecare intervention group was based on the costing questionnaire collected from a convenient sample of 50 RAMP patients who have at least one follow-up after baseline (T1), out of the 408 allocated to the intervention group (Supplementary Note 5). All these costing questionnaires were collected from their 1st visit in the telecare consultation. RAMP patients may receive different components of telecare following their routine schedule and need of the diabetes care. The table shows the average time spent on different components of telecare consultation and the staff involved. Nurse consultations involved phone confirmations by clerks, basic examinations conducted by advanced practice nurses (APNs) or doctors, and main consultation by APNs. The average time spent on phone confirmations, basic examinations and consultations was 7.2, 5.0 and 15.2 minutes respectively, with corresponding time costs of HK\$18.7, HK\$57.9 and HK\$90.6. AC consultations

also included similar components. The time spent for phone confirmations was 7.0 minutes (with median time used due to outlier) and cost HK\$18.2. Basic examinations required 5.0 minutes (HK\$57.9) in average, and the main consultations by doctor was 8.3 minutes (HK\$96.4). Other tasks included booking next appointments, reminding patients for blood taking and collecting report, and addressing inquiries, with duration ranging from 5.1 to 16.0 minutes and costs between HK\$13.2 and HK\$95.4.

Supplementary Table 8. Estimated total staff cost for telecare consultation in the intervention group (N=50)

	n	Unit cost (HK\$)	Total cost (HK\$)
Telecare consultation			
Nurse consultation			
Phone confirmation	5	18.7	93.6
Basic examination	1	57.9	57.9
Consultation	5	90.6	453.0
AC consultation			
Phone confirmation	49	18.2	1421.8
Basic examination	2	57.9	115.8
Consultation	49	96.4	4725.8
Other			
Booking next appointment	11	13.2	145.6
Reminding for blood taking/ specimen	2	13.4	26.7
Reminding for collect documents	6	23.8	143.0
Other inquiries 1	9	19.6	176.7
Other inquiries 2	3	95.4	286.1
Lump sum of total cost			7646.0
Cost per telecare consultation*			152.9

Abbreviations: AC, Associate Consultant

*Calculated as the lump sum of total cost divided by the number of subjects that have the time information recorded (N=50)

Narrative Summary

The table shows the number of different components of telecare consultation received by the 50 subjects at their 1st telecare consultation in the intervention group. These number were multiplied with the average time cost from the table in the Supplementary Table 5 as unit cost of each component to estimate the total staff time costs for a telecare consultation for these 50 subjects. Therefore, the estimated total staff cost for telecare consultations, including all components, was HK\$7,646.0, with the average staff time cost per telecare consultation at HK\$152.9.

Supplementary Table 9. Staff time cost per face-to-face consultation component in the control group (n=56)

	Average total time spent (mins)	Range (mins)	Provider (Salary per mins, HK\$)	Time cost per component (HK\$)
Face-to-face consultation				
Registration	1.6	1 – 9	Clerk (2.6)	4.1
Basic examination	4.5	1 – 19	PCA (1.8)	8.1
Eye examination				
Assessment 1	4.0	2 – 12	PCA (1.8)	7.1
Assessment 2	3.5	2 – 4	Optometrist (3.5)	12.3
Nurse consultation	20.9	1 – 38	RN (3.9) / APN (6.0)	95.9
AC consultation	6.1	2 – 14	Doctor (11.6)	70.1
Dispensing medication*	2.0*	2 – 82	Dispenser (3.0), Pharmacist (7.4)	20.8
Other				
Booking next appointment	1.5	1 – 7	Clerk (2.6)	5.0
Reminding for blood taking/ specimen	1.0	1 – 1	PCA (1.8)	1.8

Abbreviations: AC, Associate Consultant; APN, Advanced Practice Nurse; PCA, Patient Care Assistant; RN, Registered Nurse

* Estimated based on an average of 50 to 60 patients the pharmacy team can serve in an hour

Narrative Summary

The on-going staff time cost on face-to-face consultation in control group was based on the costing questionnaire collected from 56 RAMP patients with at least one follow-up after baseline (T1) (Supplementary Note 5), out of the 378 allocated to the control group. All these costing questionnaires were collected from their 1st visit in the face-to-face consultation in the control group. RAMP patients may receive different components during their visit for face-to-face consultation, following their routine schedule and need of the diabetes care. The table shows the average time spent on different components of face-to-face consultation and the staff involved. Registration by clerks required an average of 1.6 minutes (costing HK\$4.1), and basic examinations conducted by patient care assistants (PCAs) required 4.5 minutes (HK\$8.1). If eye examination was required, two assessments were conducted: the first assessment conducted by a PCA for 4.0 minutes (HK\$7.1), and the second by an optometrist

(3.5 minutes, HK\$12.3). The nurse consultation provided by either a registered nurse or APN required an average of 20.9 minutes, with a corresponding time cost HK\$95.9, while doctor consultation provided by associate consultant required 6.1 minutes (HK\$70.1). There were only 6 subjects reported the dispensing medication time, with a wide range from 2 to 82 minutes involving outliers. The time required was further validated across with clinical experience of senior pharmacist that an average of 50 to 60 patients can be served in an hour by the pharmacy team i.e. dispenser and pharmacist, and estimated to be 2 minutes for dispensing medication per subject. The corresponding time costs was estimated at HK\$20.8. Other tasks included booking next appointments and reminding patients for blood taking. The estimated time required for these tasks ranging from 1.0 to 1.5 minutes and time costs were between HK\$1.8 and HK\$5.0.

Supplementary Table 10. Estimated total staff cost for face-to-face consultation in the control group (n=56)

	n	Unit cost (HK\$)	Total cost (HK\$)
Face-to-face consultation			
Registration	56	4.1	228.7
Basic examination	40	8.1	322.7
Eye assessment			
Assessment 1	8	7.1	57.1
Assessment 2	6	12.3	73.8
Nurse consultation	35	95.9	3357.7
AC consultation	19	70.1	1332.0
Dispensing medication	6	20.8	124.8
Other			
Booking next appointment	13	5.0	65.0
Reminding for blood taking/ specimen	1	1.8	1.8
Lump sum of total cost			5563.6
Cost per face-to-face consultation*			99.4

Abbreviations: AC, Associate Consultant

*Calculated as the lump sum of total cost divided by the number of subjects that have the time information recorded (N=56)

Narrative Summary

The number of different components of face-to-face consultation received by the 56 subjects. These number were multiplied with the average time cost per component from the table in the Supplementary Table 7, the total staff time cost for attending a face-to-face consultation for these 56 subjects was estimated to be HK\$5,563.6, with the average staff time cost per subject at HK\$99.4.

Supplementary Table 11. Estimated total staff cost for face-to-face consultation not involved eye assessment and dispensing medication in the control group (n=42)

	n	Total cost (HK\$)
Face-to-face consultation		
Registration	42	161.1
Basic examination	34	281.7
Nurse consultation	30	2909.9
AC consultation	13	834.0
Other		
Booking next appointment	11	52.0
Lump sum of total cost		4238.7
Cost per face-to-face consultation*		100.9

Abbreviations: AC, Associate Consultant

*Calculated as the lump sum of total cost divided by the number of subjects that have the time information recorded (N=42)

Narrative Summary

Since eye assessment and dispensing medication are not feasible arrangement in the teleconsultation section, in order to provide a fair comparison between the cost of teleconsultation section and face-to-face consultation section, these two components were removed from the estimation on the staff cost for face-to-face consultation, leaving the data from 42 subjects for re-estimation in the table. The total staff cost for the 42 consultations did not require eye assessment and dispensing medication was HK\$4,238.7 with the average cost per face-to-face consultation at HK\$100.9.

Supplementary Table 12. Cost of health service utilisation by group and timepoint

	Intervention group			Control group		
	Average	Unit cost (HK\$)	Total cost per subject (HK\$)	Average	Unit cost (HK\$)	Total cost per subject (HK\$)
Non-arranged private GP visits						
T2	0.25	445	111.8	0.47	445	207.8
T3	0.33	445	147.3	0.55	445	243.2
Arranged public GP visits						
T2	0.03	445	14.4	0.06	445	25.5
T3	0.02	445	10.6	0.02	445	10.7
Non-arranged public GP visits						
T2	0.10	445	44.4	0.12	445	54.8
T3	0.12	445	53.0	0.14	445	62.6
A&E admissions						
T2	0.04	1230	49.1	0.05	1230	67.0
T3	0.04	1230	55.3	0.04	1230	55.2
Inpatient bed days						
T2	0.19	5100	979.3	0.17	5100	891.4
T3	0.12	5100	620.6	0.10	5100	534.4
Total cost per subject for 3 months						
T2			1199.0			1246.5
T3			886.9			906.2

Narrative Summary

The utilization of non-RAMP health service within the past 3 months at 42 weeks (T2) and 84 weeks (T3) after baseline were extracted from the CMS database for the intervention (N=408) and control (N=378) groups. The table shows the average number of visits to different health services. For the intervention group, the estimated costs of health service per subject over 3-month was HK\$1,199.0 at T2 and HK\$886.9 at T3. While for the control group, the costs of health service were HK\$1246.5 and HK\$906.2 at T2 and T3, respectively.

Supplementary Table 13. Estimated total cost per subject over 84 weeks from a provider perspective

	Intervention group	Control group
Programme costs		
Average set up costs per subject (A)	1.3	-
Maintenance costs		
Telecare consultation		
Average total staff costs (B)	152.9	-
Face-to-face consultation		
Average total staff costs (C)	No data	99.4
Total programme cost per subject over 84 weeks*	857.6	695.8
Health service utilisation		
Total health service cost per subject for 3 months		
T2	1199.0	1246.5
T3	886.9	906.2
Total health service cost per subject over 84 weeks †	7300.5	7534.3
Total cost per subject over 84 weeks	8158.1	8230.1

* Total programme costs for intervention group = A + (B+C) × 3 + (D+E) × 4; Costs for control group = (D+E) × 7

† Total health service cost = T2 3-month cost / 12 × 42 + T3 3-month cost / 12 × 42

Narrative Summary

Estimation on the total cost

Total cost per subject for the intervention and control groups during the whole study period of 84 weeks included the corresponding 1) setup costs, 2) ongoing costs of RAMP services, and 3) utilization of other non-RAMP health services. Total health service cost per subject were calculated by taking the 3-month cost collected at T2 (42-week), divided by 12 weeks to derive weekly cost and then multiplied by 42, then added the 3-month cost collected at T3 (84-week) calculated in the same way, respectively for intervention and control groups.

According to the study design, subjects in the intervention group received 3 telecare visits and 4 face-to-face visits while the control group received 7 face-to-face visits. Therefore, the total cost per subject in the intervention group was calculated as the setup cost plus the average cost per telecare consultation multiplied by three, plus the average cost per face-to-face consultation from the control group multiplied by four, plus health service cost per subject, as the formula below.

- Total cost per subject (intervention group) = set up cost + cost per Telecare x 3 + cost per face-to-face x 4 + health service cost per subject

The total cost per subject in the control group was calculated as the average cost per face-to-face consultation multiplied by seven.

- Total cost per subject (control group) = cost per face-to-face x 7 + health service cost per subject.

However, there were some limitations in the data collected in the following aspects. Firstly, the staff time was recorded during the first telecare consultation for the intervention group and the first face-to-face consultation for the control group, not for all the visits during the study period; secondly, staff time was also not recorded for the face-to-face consultations in the intervention group. Given these limitations, assumptions need to be made in order to estimate the total costs per subject over the 84 weeks study period as follows.

1. the time data available for the first visit were representative and can be applied to subsequent visits; and
2. the face-to-face consultations for the intervention group were comparable to those in the control group and can be applied as the cost of face-to-face visit for the intervention group.

The validity of these assumptions depends on the similarity or difference of the subsequent visits and between the face-to-face consultations in the intervention and control groups. These assumptions require further evidence or data collection to validate, and the current cost estimates should be interpreted with caution.

If the above assumptions were valid, the total cost per subject over 84 weeks period in each group was estimated under the government perspective. The total programme cost in the intervention group was HK\$857.6 per subject, while the total health service cost was HK\$7300.5. This resulted in a total cost of HK\$8158.1 per subject over 84 weeks in the intervention group. The total face-to-face consultation cost in the control group was HK\$695.8 per subject, while total health service cost was HK\$7534.3, leading to a total of HK\$8230.1 per subject in the control group over 84 weeks.

Supplementary Table 14. Patient time and travel costs in the intervention and control groups

	n	Average time (mins)	Hourly pay (HK\$) *	Total cost (HK\$)
Intervention group (n=33) †				
Total time spent on telecare consultation ‡	33	28.5	107.8	1689.4
Proportion of subjects needed to visit clinic to obtain medication after a telecare consultation	75.8%			
Time and travel costs for obtaining medication				
Total time spent in clinic	25	40.0	107.8	1799.0
Travel time (two ways)	25	50.8	107.8	2282.4
Transportation cost (two ways)	25	-	-	355.6
Total cost				6126.4
Cost per patient †				185.6
Control group (n=56)				
Proportion of subjects needed to obtain medication after a face-to-face consultation	10.7%			
Time and travel costs for face-to-face consultation				
Total time spent in clinic ^	56	73.4	107.8	7390.0
Travel time (two ways)	56	41.3	107.8	4155.1
Transportation cost (two ways)	56	-	-	307.9
Accompanying person				
Total time spent in clinic ^	4	75	107.8	539.2
Travel time (two ways)	4	43.8	107.8	314.5
Transportation cost (two ways)	4	-	-	12.0
Total cost				12718.7
Cost per patient				227.1

* Calculated as: median monthly salary (HK\$20700) x 12 / 52 / weekly working hours (44.3)

† Based on telephone survey from 33 subjects in the intervention group

‡ Including time for preparation, nurse consultation, doctor consultation, and others

^ Including time spent on consultation and obtaining medication

Narrative Summary

There were 33 (out of 408) subjects in the intervention group completed the telephone survey to collect data on patient time and travel costs, while 56 (out of 378) subjects in the control completed the survey and provided these data. Data collected from this smaller number of subjects may not fully capture the variation in patient time and travel costs. Further, 75.8% (25/33) subjects in the intervention group reported the prescription of medication (i.e. visiting the clinic on the same or other day to obtain medicine) after the tele-consultation, while only 10.7% (6/56) subjects in the control group reported the prescription after the face-to-face consultation. Therefore, due to these uncertainties, the estimates of patient time and travelling cost, as well as total cost under societal perspective were reported as additional analysis for information rather than main analysis.

From the 33 subjects completing the survey in the intervention group, the average time spent on a telecare consultation by them was estimated to be 28.5 minutes per subject. Among them, 25 subjects reported visiting the clinic on the same or other day to obtain medicine, with an average two ways travel time of 50.8 minutes and staying time at clinic of 40.0 minutes. No accompanied person was reported. The total time cost plus two ways transportation cost was estimated to be HK\$6126.4 for the 33 subjects, with an average of HK\$185.6 per subject.

From the 56 subjects completing the survey in the control group, the average time they spent in the clinic was 73.4 minutes and average two ways travel time was 41.3 minutes per subject. Of the 56 subjects, 4 were accompanied by another person. The total time cost and transportation cost, including the subjects and accompanying persons, was estimated to be HK\$12718.7 for the 56 subjects, with an average of HK\$227.1 per subject.

Supplementary Table 15. Estimated total cost per subject over 84 weeks from a societal perspective

	Intervention group	Control group
Programme costs		
Average set up costs per subject (A)	1.3	-
Maintenance costs		
Telecare consultation		
Average total staff costs (B)	152.9	-
Average total patient costs (C)	185.6	-
Face-to-face consultation		
Average total staff costs (D)	No data	99.4
Average total patient costs (E)	No data	227.1
Total staff cost per subject over 84 weeks*	856.3	695.8
Total patients cost per subject over 84 weeks†	1465.2	1589.7
Total programme cost per subject over 84 weeks‡	2322.8	2285.5
Health service utilisation		
Total health service cost per subject for 3 months		
T2	1199.0	1246.5
T3	886.9	906.2
Total health service cost per subject over 84 weeks^	7300.5	7534.3
Total cost per subject over 84 weeks	9623.3	9819.8

* Total staff costs for intervention group = B×3 + D (control group)×4; Costs for control group = D×7

† Total patient costs for intervention group = C×3 + E (control group)×4; Costs for control group = E×7

‡ Total programme costs for intervention group = A + (B+C)×3 + (D+E)×4; Costs for control group = (D+E) ×7

^ Total health service cost = T2 3-month cost / 12 × 42 + T3 3-month cost / 12 × 42

Narrative Summary

From the societal perspective, as an additional analysis, the total patient cost per subject was HK\$1465.2 in the intervention group and was HK\$1589.7 in the control group. The total cost per subject was HK\$9623.3 and HK\$9819.8 in the intervention and control group, respectively.

Supplementary Table 16. Summary of Implementation Process Aligned with Durlak and DuPre's Framework¹

Implementation Phase	Framework Component	Implementation Description
Development and Exploration	Innovation Characteristics	• The intervention aligned with existing GOPC workflows to enhance feasibility. • HA Go, an existing telecommunication platform within the Hospital Authority, was adopted. • The research and GOPC teams co-developed the protocol, referral pathways, and role definitions. • Printed user guides and visual workflows were created to reduce complexity.
	Community-Level Factors	• The programme was implemented within a health system expanding its digital care capabilities. • The COVID-19 pandemic accelerated interest in virtual care delivery. • Organisational readiness and policy developments informed early planning and alignment.
Preparation	Provider Characteristics	• Orientation sessions introduced the programme's rationale, objectives, and operational steps. • Healthcare providers were engaged in protocol refinement to build ownership and relevance. • Training materials clarified procedures and provider responsibilities.
	Prevention Support System	• Visual and written user guides were distributed to all participating staff. • One-on-one follow-up meetings and telephone support were provided to address concerns. • The IT team was engaged to prepare for virtual delivery requirements.
Operation	Prevention Delivery System	• The programme was delivered in seven GOPCs using the same clinical teams across groups. • All patients received the standard RAMP protocol. • The intervention group alternated between telecare and face-to-face consultations; the control group received face-to-face care only. • Each group had seven consultations over 84 weeks.
	Prevention Support System	• Clerical staff contacted intervention patients one hour before each telecare session for preparation. • The IT team addressed technical issues in real time. • Ongoing support was offered to healthcare providers throughout the implementation period.
Sustainability	Prevention Support System	• Bimonthly meetings were held to review progress and resolve operational issues. • Adjustments to workflow and delivery processes were documented systematically. • Iterative refinements ensured implementation fidelity while responding to site-level feedback.
	Community-Level Factors	• The programme remained adaptable to updates in the Hospital Authority's digital care policies.

		• All protocol changes were recorded to maintain alignment with evolving institutional standards.
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1. Durlak JA, DuPre EP. Implementation matters: a review of research on the influence of implementation on program outcomes and the factors affecting implementation. Am J Community Psychol. 2008;41(3-4):327-350.