Supplementary materials

Suppl. 1. Participants' awareness of virtual nursing for T1D

Items	Adolescents (*N* = 150)			Paediatric nursing students (*N* = 200)			Paediatric nurses (*N* = 50)			ANOVA (*F*-test)	*P*-value
	Unsatisfactory	Satisfactory	Very satisfactory	Un satisfactory	Satisfactory	Very satisfactory	Unsatisfactory	Satisfactory	Very satisfactory		
	N (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)		
Concept											
A broader term encompassing the entirety of remote and/or technology-driven nursing care	78 (52%)	50 (33.3)	22 (14.7)	107 (53.5)	69 (34.5)	24 (12)	23 (46)	22 (44)	5 (10)	3.67	0.05
Virtual nurses assist hospitals and healthcare facilities to reduce the legwork of onsite nurses and see the subtle signs and symptoms that can point to status changes.	76 (50.7)	55 (36.7)	19 (12.7)	111 (55.5)	55 (27.5)	34 (17)	28 (56)	15 (30)	7 (14)		

Desired outcome											
Enhance access to care	97 (64.7)	35 (33.3)	18 (12)	123 (61.5)	53 (26.5)	24 (12)	13 (26)	22 (44)	15 (30)	3.45	0.01
Useful for provide high-quality, appropriate and safe care	45 (90)	55 (36.7)	50 (33.3)	117 (58.5)	55 (27.5)	78 (39)	17 (34)	27 (54)	6 (12)		
Improve patient and provider experience of care	76 (50.7)	34 (22.7)	40 (26.7)	105 (52.5)	69 (46)	26 (17.3)	18 (36)	12 (24)	20 (40)		
Improve health system efficiency	112 (74.7)	32 (21.3)	6 (4)	99 (49.5)	77 (38.5)	24 (12)	16 (32)	16 (32)	18 (36)		
Model for application	115 (76.7)	33 (22)	2 (1.3)	102 (51)	78 (39)	20 (10)	19 (38)	12 (24)	19 (38)		
Enhance patient self-care by attractive virtual method	107 (71.3)	23 (15.3)	20 (13.3)	98 (49)	58 (29)	44 (22)	12 (24)	20 (40)	18 (36)		
Decline admission and emergency for hypoglycemia	111 (74)	25 (16.7)	14 (9.3)	104 (52)	69 (34.5)	27 (13.5)	17 (34)	12 (24)	21 (42)		
Overcome nursing shortage	99 (66)	27 (18)	24 (16)	111 (55.5)	79 (39.5)	10 (5)	12 (24)	34 (68)	5 (10)		
Saving time and effort	92 (61.3)	29 (19.3)	29 (19.3)	99 (49.5)	97 (48.5)	4 (2)	21 (42)	22 (44)	7 (14)		
Electronic health record	98 (65.3)	22 (14.7)	30 (20)	117 (58.5)	45 (22.5)	38 (19)	19 (38)	23 (46)	8 (16)		

Virtual reality simulation for education and training	109(72.7)	26 (17.3)	15 (10)	89 (44.5)	56 (28)	55 (27.5)	16 (32)	25 (50)	9 (18)		
Continuity of care after discharge	121(80.7)	28 (18.7)	11 (7.3)	70 (35)	77 (38.5)	56 (28)	10 (20)	29 (18)	11 (22)		
Ensure treatment adherence	121(80.7)	33 (22)	6 (4)	89 (44.5)	59 (29.5)	55 (27.5)	16 (32)	26 (52)	8 (16)		
Prevent unnecessary re-admissions	126(84)	32 (21.3)	2 (1.3)	49 (24.5)	64 (32)	87 (43.5)	10 (20)	28 (56)	12 (24)		

Suppl. 2. Challenges associated with using virtual nursing care for T1D

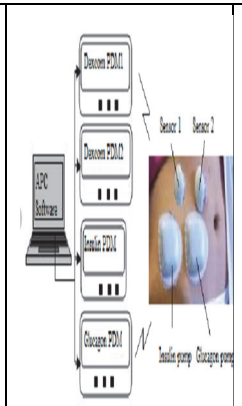
Domain	**Adolescents (*N* = 150)**			**Paediatric nursing students (*N* = 200)**			**Paediatric nurses (*N* = 50)**			ANOVA (*F*-test)	*P*-value
	Not important	Important	Very important	Not important	Important	Very important	Not important	Important	Very important		
	N (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)		
Organizational effectiveness and support	63 (42)	58 (38.7)	19 (12.7)	143 (71.5)	34 (17)	23 (11.5)	12 (24)	23 (46)	15 (30)	4.90	0.01
Nursing staff motivation	84 (56)	49 (32.7)	17 (11.3)	93 (46.5)	45 (22.5)	12 (6)	11 (22)	22 (44)	17 (34)		
Patient satisfaction	57 (38)	56 (37.3)	11 (7.3)	142 (71)	47 (23.5)	11 (5.5)	14 (28)	31 (62)	5 (10)		
Trustworthiness collectively	114 (76)	23 (15.3)	13 (8.7)	110 (55)	74 (37)	16 (8)	15 (30)	24 (48)	11 (22)		
Patient, staff training	50 (33.3)	66 (44)	34 (22.7)	107 (53.5)	75 (37.5)	18 (9)	18 (36)	27 (54)	5 (10)		

Technical problems (hardware, connections)	78 (52)	56 (37.3)	16 (10.7)	130 (65)	58 (29)	12 (6)	17 (34)	22 (44)	11 (22)		
Defeat direct contact	126 (84)	12 (8)	12 (8)	86 (43)	95 (47.5)	19 (9.5)	9 (18)	21 (42)	20 (40)		
Devices expensive	34 (22.7)	96 (64)	20 (13.3)	147 (73.5)	34 (17)	19 (9.5)	12 (24)	19 (38)	19 (38)		

Suppl. 3. Participants' awareness of advanced device technology for T1D

Variable		**Adolescents (*N* = 150)**			**Paediatric nursing students (200)**			**Paediatric nurses (50)**			ANOVA (*F*-test)	*P*-value
		Unsatis-factory	Satis-factory	Very satisfactory	Unsatis-factory	Satis-factory	Very satis-factory	Unsati-factory	Satis-factory	Very satis-factory		
		N (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)		
Real-time continuous glucose monitoring (CGM)		103 (68.7)	45 (30)	2 (1.3)	147 (73.5)	34 (17)	19 (9.5)	26 (52)	**15 (30)**	9 (18)	3.01	0.05
Flash glucose monitoring (FGM)		77 (51.3)	**76 (50.7)**	9 (6)	100 (50)	38 (19)	12 (6)	34 (68)	5 (10)	11 (22)		

Automated insulin delivery		98 (65.3)	44 (29.3)	8 (5.3)	123 (61.5)	18 (9)	9 (4.5)	25 (50)	13 (26)	12 (24)		
Threshold suspend		67 (44.7)	66 (44)	9 (6)	154 (77)	38 (19)	8 (4)	27 (54)	5 (10)	18 (36)		
Predictive low glucose suspend		119 (79.3)	30 (20)	11 (7.3)	99 (49.5)	**39 (19.5)**	12 (6)	34 (68)	5 (10)	11 (22)		
Hybrid-closed loop system		122 (81.3)	16 (10.7)	12 (8)	105 (52.5)	34 (17)	11 (5.5)	23 (46)	9 (18)	18 (36)		
Advanced hybrid closed-loop IQ controller		110 (73.3)	34 (22.7)	6 (4)	102 (51)	32 (16)	16 (8)	24 (48)	9 (18)	17 (34)		
Fully closed-loop system		109 (72.7)	31 (20.7)	10 (6.7)	111 (55.5)	25 (12.5)	14 (7)	28 (56)	8 (16)	14 (28)		

An artificial pancreas technology (dual hormone)		106 (70.7)	42 (28)	2 (1.3)	119 (59.5)	18 (9)	13 (6.5)	39 (78)	2 (4)	13 (26)		

Suppl. 4. Distribution of participants' attitudes towards virtual nursing for T1D management

Items	**Agree**			**Neutral**			**Disagree**			ANOVA (*F*-test)	*P*-value
	Adolescents (*N* = 150)	Paediatric nursing students (*N* = 200)	Paediatric nurses (50)	Adolescent (*N* = 150)	Paediatric nursing students (*N* = 200)	Paediatric nurses (*N* = 50)	Adolescents (*N* = 150)	Paediatric nursing students (*N* = 200)	Paediatric nurses (*N* = 50)		
	N (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)		
Changes the virtual care has brought	110 (73.3)	123 (61.5)	44 (88)	30 (20)	54 (27)	4 (8)	10 (6.7)	23 (11.5)	2 (4)	3.02	0.05
Are there factors that hinder virtual care	107 (71.3)	134 (67)	39 (78)	23 (15.3)	44 (22)	9 (18)	20 (13.3)	22 (11)	2 (4)		
Are there difficulties in achieving virtual care	109 (72.7)	156 (78)	37 (74)	24 (16)	30 (15)	8 (16)	17 (11.3)	14 (7)	5 (10)		
Experience in virtual nursing is important	122 (81.3)	135 (67.5)	33 (66)	14 (9.3)	41 (20.5)	12 (24)	14 (9.3)	24 (12)	3 (6)		

Important to overcome the problems of the Internet	106 (70.7)	115 (57.5)	35 (70)	23 (15.3)	60 (30)	11 (22)	21 (14)	25 (12.5)	4 (8)		
Training to deal with virtual care is necessary	105 (70)	152 (76)	28 (56)	33 (22)	21 (10.5)	16 (32)	11 (7.3)	27 (13.5)	6 (12)		
Virtual tool will affect communication in meeting	111 (74)	129 (64.5)	30 (60)	26 (17.3)	58 (29)	13 (26)	13 (8.7)	13 (6.5)	7 (14)		
Virtual communication strengthens participation and control over self-care	119 (79.3)	119 (59.5)	30 (60)	23 (15.3)	62 (31)	18 (36)	8 (5.3)	19 (9.5)	2 (4)		
like better the virtual contact	99 (66)	129 (64.5)	37 (74)	34 (22.7)	59 (29.5)	8 (16)	17 (11.3)	12 (6)	5 (10)		
Virtual care as a complement to physical meetings	119 (79.3)	135 (67.5)	34 (68)	16 (10.7)	54 (27)	13 (26)	15 (10)	11 (5.5)	3 (6)		

Suppl. 5. Distribution of participants' attitudes towards advanced T1D devices

Items	**Agree**			**Neutral**			**Disagree**			ANOVA (*F*-test)	*P*-value
	Adolescents (*N* = 150)	Paediatric nursing students (*N* = 200)	Paediatric nurses (50)	Adolescents (*N* = 150)	Paediatric nursing students (*N* = 200)	Paediatric nurses (*N* = 50)	Adolescents (*N* = 150)	Paediatric nursing students (*N* = 200)	Paediatric nurses (*N* = 50)		
	N (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)		
Advanced device (AD) can reduce the burden	113 (75.3)	55 (27.5)	42 (84)	30 (20)	57 (28.5)	4 (8)	7 (4.7)	38 (19)	4 (8)	2.38	0.000
Advanced devices can prevent hypoglycaemia	65 (43.3)	99 (49.5)	29 (58)	45 (30)	67 (33.5)	15 (30)	40 (26.7)	34 (17)	6(12)		
Advanced devices are safety and efficacy	119 (79.3)	88 (44)	36 (72)	13 (8.7)	62 (31)	11 (22)	18 (12)	50 (25)	3 (6)		
Advanced devices are expensive	50 (33.3)	70 (35)	35 (70)	60 (40)	64 (32)	7 (12)	40 (26.7)	66 (33)	8 (16)		
Internet access is important	99 (66)	107 (53.5)	17 (34)	31 (20.7)	77 (38.5)	24 (48)	20 (13.3)	16 (8)	9 (18)		
Training about advanced devices was obligatory	45 (30)	58 (29)	17 (34)	55 (36.7)	112 (56)	23 (46)	50 (33.3)	30 (15)	10 (20)		
Advanced devices are easy to use	103 (68.6)	113 (75.3)	22 (44)	37 (24.7)	77 (51.3)	14 (28)	10 (6.7)	10 (5)	14 (28)		