

Outcome of Telephone-Messages Intervention On Self-Care Practices Among Diabetic Patients in A Secondary Health Facility in Oyo State, Nigeria

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Abstract:

The study examined the outcome of telephone-messages intervention on self-care practices among diabetic patients in a secondary health facility in Oyo State, Nigeria. The objectives of the study was to examine the baseline, post-intervention and 6th week follow-up levels of self-care practices among diabetic patients exposed to telephone-messages intervention. The study utilized a quasi-experimental design. The study population for the study was Type 2 Diabetes patients enrolled in selected Hospital in Oyo State. Thirty participants were selected through multi-stage sampling procedure from a health facility in Oyo State. The instrument was a semi-structured questionnaire, which sought information on self-care practices. Descriptive and inferential statistics were used to analysed the collected data. The study revealed that patients' self-care sub domain variable proportion such as physical activities, healthy eating, monitoring blood glucose, compliance with medication and risk reduction behavior was low in the baseline. At the immediate post-intervention, the respondents' physical activities had a mean of 8.83 with SD of 3.65; healthy eating 9.03 with SD of 3.72; monitoring blood glucose activities 10.70 with SD of 4.3; compliance with medication activities 12.40 with SD of 4.35; risk reduction 12.17 with SD of 4.50; and foot care 11.27 with SD of

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5.03. The study also revealed that at 6th week of follow-up, the respondents' physical activities had a mean of 11.13 with SD of 0.97; healthy eating 11.27 with SD of 0.69; monitoring blood glucose activities 13.50 with SD of 1.25; compliance with medication activities 14.03 with SD of 1.07; risk reduction 13.93 with SD of 1.34; and foot care 13.83 with SD of 1.34. The study concluded that periodic telephone messages on diabetics positively influenced performance of self-care practices. It was recommended among others that Doctors and nurses should include short messages on diabetes to patients as a reminder to focus better self-care practices.

Keywords: Telephone-Messages, Intervention, Self-care Practices, Diabetes,



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INTRODUCTION

Diabetes is one of the top 10 causes of death globally and together with cardiovascular disease, cancers and respiratory diseases, these conditions account for over 80% of all premature non-communicable diseases and deaths (Global Burden of Disease 2015 Risk Factors Collaborators, 2016). Individuals with diabetes have a two to three folds risk of all-cause mortality (Yang, et al., 2019). Although progress has been made in promoting population health and extending life expectancy, diabetes is the second biggest negative total effect on reducing global health adjusted life expectancy worldwide (Chen, Chen, Zheng, &Guo, 2019).

The global burden of diabetes has increased significantly since 1990. Both the trend and magnitude of diabetes related diseases burden have varied substantially across regions and countries. Since 2000, the International Diabetes Federation (IDF) has reported the national, regional and global occurrence of diabetes. In 2009 it was estimated that 285 million people had diabetes (T1D and T2D combined) (IDF, 2009), increasing to 366 million in 2011 (IDF, 2011), 382 million in 2013 (IDF, 2013), 415 million in 2015 (IDF, 2015), and 425 million in 2017 (IDF, 2017).

Sub-Saharan Africa (SSA) countries are expected to experience the worldwide fastest increase in the number of people living with type 2 diabetes in the next two decades (IDF, 2015). It is estimated that developing countries will bear 77% of the global burden of diabetes in the 21st century (Nandeshwar, et al., 2010). In SSA, the challenge posed by Diabetes is even more overwhelming since diabetes have to share scarce resources with infectious diseases and malnutrition (Wolde, et al., 2020). The proportion of undiagnosed diabetes in Africa (66.7%) is almost two times higher than that of developed countries, which is 37% (Saeedi, et al., 2020). This also contributes to the higher burden of morbidity and mortality at an early age in Africa.

There is no doubt that the burden of diabetes in Nigeria is increasing with increasing morbidity and mortality. Studies have also revealed a high trend of diabetes prevalence in Oyo State. A study conducted in Ibadan Oyo State by Odeyinka and Ajayi (2017), revealed diabetes in Ibadan Oyo state has a prevalence of 3.4%. Another study conducted by Rasaki, et al., (2017) to assess the prevalence of diabetes and pre-diabetes and associated risk factors among indigenes of Oke-Ogun geo-political zone of Oyo State showed that the prevalence of diabetes in this study was 4.6% (93.7% female, 6.3% male) and pre-diabetes 6.0% (85.0% female and 15.0% male).

Self-care behaviors can be improved using Telephone-messages to remind patients about their self-care activities, which is minimally intrusive to patients' privacy and can be delivered through simpler Telephones, enabling potential access to a larger number of clients (Vervloet, et al., 2012). Hence, Short Message Service (SMS) reminders offer a promising method of promoting the self-care of patients, especially those who suffer from chronic conditions and are required to practice self-care activities. Telephone SMS is a documented measure for transmitting health information, even to the most remote areas of the world (Sinha, & Barry, 2011; Goodarzi, et al., 2012). The mobile penetration in Nigeria and most parts of sub-Saharan Africa, in recent years, is such that very good cellular telephone signals are present even in most remote and poor communities. Nigeria has the seventh highest



number of mobile phone users in the world; 172 million in 2019 (Oluma, et al, 2020). Successful use of mobile phone in health programming has been reported in the literature; an approach that is known as m-health. Various studies have shown that mobile phones can be used to improve access to and the quality of healthcare. Telephone SMS could be used to foster diabetes patients' knowledge and promote the recommended therapy and improved treatment outcomes (Quinn, et al., 2011; Shariful-Islam, et al., 2015). Considering the chronic nature of diabetes and the importance of patients' involvement, improvement in self-management behaviour, which could result from the SMS intervention, would contribute to improved outcome and quality of life of the patients. Education and information technology are parts of diabetes care that have been studied. Therefore the study examined the outcome of telephone-messages intervention on self-care practices among diabetic patients in a secondary health facility in Oyo State, Nigeria. Specifically, the objectives of the study was to examine;

1. the baseline level of self-care practices among diabetic patients exposed to telephone-messages intervention;
2. level of telephone-messages intervention on practices of self-care among diabetic patients; and
3. the self-care practices among diabetic patients exposed to telephone-messages intervention at 6th week follow-up.

Research Questions

The following research questions were raised for this study;

1. What is the baseline level of self-care practices among diabetic patients exposed to telephone-messages intervention in a secondary health facility in Oyo State?
2. What is the level of telephone-messages intervention on practices of self-care among diabetic patients in a secondary health facility in Oyo State?
3. What are the self-care practices among diabetic patients exposed to telephone-messages intervention at 6th week follow-up in a secondary health facility in Oyo State?

Methodology

The study utilized a quasi-experimental design to determine the effect of Telephone messages intervention on self-care practices among diabetes patients in a selected hospital in Oyo State.

Table 1: Description of the Design for the Study

Group	Baseline Data	Interventions For 6 Weeks	Outcome Evaluation at the end of 6 weeks intervention	Impact Evaluation at 6th week follow up
Telephone-messages	O	X	O	O

Key: X = Treatment (Intervention sessions)

O = Observations

The study population for the study was Type 2 Diabetes patients enrolled in selected Hospital in Oyo State. The patients were within the age range of 20 - 60 years old and above



from the selected secondary health facility in Oyo State. Thirty participants selected through multi-stage sampling procedure from a health facility in Oyo State were used for the study. The instrument was a semi-structured questionnaire, which sought information on the socio-demographic characteristics and self-care practices. The same instrument was administered at baseline, immediate post intervention (at the end of 6 weeks training), and 6th weeks follow up. Validity was done in order to inspect the content of the instrument to see if they measure what they are really expected to measure and was checked by experts in the field of public health.

Data collection was carried out using the instrument designed for the study. This procedure was in three (3) phases. The research assistants had 1-day training on the purpose of the research, the method to employ for data collection, data administration and data entry. The intervention phase was conducted one day per week for six (6) weeks. Descriptive and inferential statistics were used to analyse the collected data.

Results

Research Question 1: What is the baseline level of self-care practices among diabetic patients exposed to telephone-messages intervention in a secondary health facility in Oyo State?

Table 1: Baseline Level of self-care practices among diabetic patients exposed to telephone-messages intervention

Self-Care Behavior	Telephone-messages intervention F (%)
Physical Activities Measured on a 12-point Rating Scale	
Low (0-6)	30 (100.0)
High (7-12)	0 (0.0)
Mean \pm SD	4.03\pm1.19
Healthy Eating Measured on a 12-point Rating Scale	
Low (0-6)	25 (83.3)
High (7-12)	5 (16.7)
Mean \pm SD	4.50\pm1.78
Monitoring Blood Glucose Measured on a 15-point Rating Scale	
Low (0-7.5)	30 (100.0)
High (7.6-15)	0 (0.0)
Mean \pm SD	4.73\pm1.11
Compliance With Medication Measured on a 15-point Rating Scale	
High (0-7.5)	18 (60.0)
Low (7.6-15)	12 (40.0)
Mean \pm SD	7.20\pm3.17
Risk Reduction Behavior Measured on a 15-point Rating Scale	



Low (0-7.5)	23 (76.7)
High (7.6-15)	7 (23.3)
Mean \pm SD	6.47\pm1.93
Foot Care Measured on a 15-point Rating Scale	
Low (0-7.5)	13 (43.3)
High (7.6-15)	17 (56.7)
Mean \pm SD	8.20\pm2.78
Overall Self- Care Measured on an 84-point Rating Scale	
Low (0-42)	27 (90.0)
High (43-84)	3 (10.0)
Mean \pm SD	35.13\pm 6.37

The patients' self-care practice was measured on an 84-point rating scale which was sectioned to assess the patients' physical activities, healthy eating, monitoring blood glucose, compliance with medication, risk reduction behavior and foot care behavior. Patients Mean \pm SD score regarding physical activities, measured on a 12-point rating scale in the experimental group was 4.03 \pm 1.19. Also, patient's healthy eating behavior measured on a 12-point rating scale on all the groups showed a mean score of 4.50 \pm 1.78. Furthermore, monitoring blood glucose by patients measured on a 15-point rating scale computed for experimental group showed a Mean \pm SD score of 4.73 \pm 1.11. In addition, patients' compliance with medication score measured on a 15-point rating scale computed for experimental group showed a Mean \pm SD of 7.20 \pm 3.17. Again, patients risk reduction behaviors mean score measure on a 15-point rating scale for the group was 6.47 \pm 1.93. Furthermore, patients' foot care behavior computed for group measured on a 15-point rating scale, showed a mean score of 8.20 \pm 2.78. The overall self-care behavior score for the group at baseline measured on an 84-point rating scale showed a mean score of 35.13 \pm 6.37.

Patients' self-care sub domain variable proportion such as physical activities, healthy eating, monitoring blood glucose, compliance with medication and risk reduction behavior was low in the baseline. However, foot care behavior was high

Research Question 2: What is the level of telephone-messages intervention on practices of self-care among diabetic patients in a secondary health facility in Oyo State?

Table 2: Level of self-care practices among diabetic patients exposed to telephone-messages intervention

Variable	Maximum Points on Scale of Measure	Telephone-Messages N=30
Overall Self-Care Low (0-42) High (43-84) Mean \pm SD	84	4 (13.3) 26 (86.7) 64.40 \pm 24.79
Physical Activities Low (0-6) High (7-12)	12	5 (16.7) 25 (83.3)



Mean±SD		8.83±3.65
Healthy Eating	12	
Low (0-6)		4 (13.3)
High (7-12)		26 (86.7)
Mean±SD		9.03±3.73
Monitoring Blood Glu.	15	
Low (0-7.5)		4 (13.3)
High (7.6-15.0)		26 (86.7)
Mean±SD		10.70±4.30
Compliance	15	
Low (0-7.5)		3 (10.0)
High (7.6-15)		27 (90.0)
Mean±SD		12.40±4.36
Risk Reduction	15	
Low (0-7.5)		4 (13.3)
High(7.6-15)		26 (86.7)
Mean±SD		12.17±5.00
Foot Care	15	
Low (0-7.5)		5 (16.7)
High(7.6-15)		25 (83.3)
Mean±SD		11.27±5.04

The respondent's' self-care of diabetics was measured using different typologies of self-care at the immediate post-intervention such as physical activities, healthy eating, monitoring blood glucose, compliance with medication, risk reduction and foot care. The overall self-care behavior measured on an 84- point rating scale revealed the mean and standard deviation (SD) as 64.40 and 24.79 respectively.

The respondents' physical activities had a mean of 8.83 with SD of 3.65; healthy eating 9.03 with SD of 3.72; monitoring blood glucose activities 10.70 with SD of 4.3; compliance with medication activities 12.40 with SD of 4.35; risk reduction 12.17 with SD of 4.50; and foot care 11.27 with SD of 5.03.

Table 3: Impact Evaluation for Self-Care practices of respondents exposed to telephone-messages intervention

Variables	Maximum Points on Scale of Measure	Baseline N=30		Post Intervention N=30		*ES (95%CI)	p-value
		$\bar{x}(SE)\pm SD$		$\bar{x}(SE)\pm SD$			
Overall Self-Care	84	35.13 (1.16)	6.37	64.40 (4.53)	24.79	- 1.644 (-6.15 to 2.86)	0.00
Physical Activities	12	4.03 (0.22)	1.19	8.83 (0.67)	3.65	-1.799 (-2.47 to - 1.12)	0.00



Healthy Eating	12	4.50 (0.32)	1.78	9.03 (0.68)	3.72	- 1.579 (-2.31 to -0.85)	0.00
Monitoring Blood Glu.	15	4.73 (0.20)	1.11	10.70 (0.79)	4.30	- 1.932 (-2.71 to -1.15)	0.00
Compliance	15	7.20 (0.58)	3.17	12.40 (0.80)	4.36	-1.388 (-2.34 to -0.44)	0.00
Risk Reduction	15	6.47 (0.35)	1.93	12.16 (0.91)	5.00	-1.531 (-2.47 to -0.66)	0.00
Foot-Care	15	8.20 (0.51)	2.78	11.27 (0.92)	5.04	-0.77 (-1.78 to 0.25)	0.00

Table 3 indicated statistically significant differences in the mean scores and the effect size computed indicating the magnitude of the differences in means between baseline and immediate post intervention was significant. The overall effect size was -1.644 with p-value of 0.000.

Research Question 3: What are the self-care practices among diabetic patients exposed to telephone-messages intervention at 6th week follow-up in a secondary health facility in Oyo State?

Table 4: Self-care practices among diabetic patients exposed to telephone-messages intervention at the 6th week follow-up

Variable	Maximum Points on Scale of Measure	Telephone-messages N=30
Overall Self-Care Low (0-42) High (43-84) Mean±SD	84	0 (0.00) 30 (100.0) 77.70±4.69
Physical Activities Low (0-6) High (7-12) Mean±SD	12	0 (0.00) 30 (100.0) 11.13±0.97
Healthy Eating Low (0-6) High (7-12) Mean±SD	12	0 (0.00) 30 (100.0) 11.27±0.69
Monitoring Blood Glu. Low (0-7.5) High (7.6-15.0) Mean±SD	15	0 (0.0) 30 (100.0) 13.50±1.25
Compliance Low (0-7.5) High (7.6-15) Mean±SD	15	0 (0.00) 30 (100.0) 14.03±1.07



Risk Reduction Low (0-7.5) High (7.6-15) Mean±SD	15	0 (0.00) 30 (100.0) 13.93±1.34
Foot Care Low (0-7.5) High (7.6-15) Mean±SD	15	0 (0.00) 30 (100.0) 13.83±1.34

The respondent's' self-care of diabetics was measured using different typologies of self-care such as physical activities, healthy eating, monitoring blood glucose, compliance with medication, risk reduction and foot care at 6th week of follow-up. The overall self-care behavior measured on an 84- point rating scale revealed the mean and standard deviation (SD) as 77.70 and 4.69 respectively.

The respondents' physical activities had a mean of 11.13 with SD of 0.97; healthy eating 11.27 with SD of 0.69; monitoring blood glucose activities 13.50 with SD of 1.25; compliance with medication activities 14.03 with SD of 1.07; risk reduction 13.93 with SD of 1.34; and foot care 13.83 with SD of 1.34.

Table 5: Impact Evaluation for Self-Care practices of respondents exposed to telephone-messages intervention at the 6th week follow-up

Variables	Maximum Points on Scale of Measure	Baseline N=30		Follow-up N=30		*ES (95%CI)	p-value
		$\bar{x}(SE)\pm SD$		$\bar{x}(SE)\pm SD$			
Overall Self-Care	84	35.13 (1.16)	6.37	77.70 (0.86)	4.69	- 7.738 (-9.13 to -6.35)	0.00
Physical Activities	12	4.03 (0.22)	1.19	11.13 (0.18)	0.97	-6.648 (-6.92 to -6.38)	0.00
Healthy Eating	12	4.50 (0.32)	1.78	11.27 (0.13)	0.69	- 5.106 (-5.44 to -4.77)	0.00
Monitoring Blood Glu.	15	4.73 (0.20)	1.11	13.50 (0.23)	1.25	- 7.528 (-7.82 to -7.23)	0.00
Compliance	15	7.20 (0.58)	3.17	14.03 (0.19)	1.07	-2.942 (-3.53 to -2.35)	0.00
Risk Reduction	15	6.47 (0.35)	1.93	13.93 (0.24)	1.34	-4.582 (-4.99 to -4.17)	0.00
Foot-Care	15	8.20 (0.51)	2.78	13.83 (0.24)	1.34	-2.622 (-3.17 to -2.08)	0.00

*ES: effect size of the intervention computed from Cohen's d

Table 5 indicated statistically significant differences in the mean scores and the effect size computed indicating the magnitude of the differences in means between baseline and 6th week follow-up was significant. The overall effect size was -7.738 with p -value of 0.000 .

The interaction plot in the telephone-messages intervention showed that the respondents' self-care practices increased across time. There was a significant increase in the self-care practice between the baseline and immediate post-intervention time. The increase in mean score was sustained at the follow-up period (Figure 1)

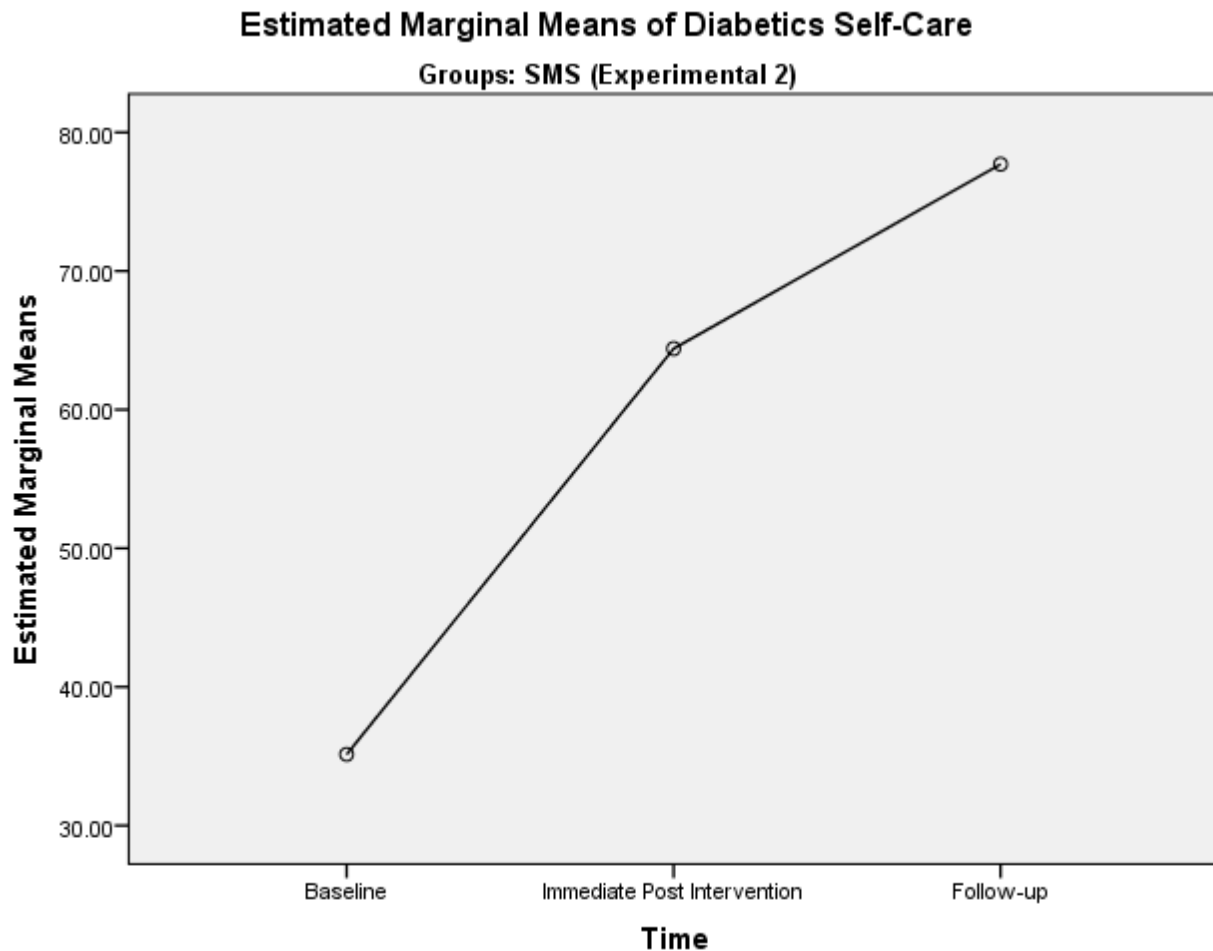


Figure 1: Plot Showing the Change in the Respondents' Self-Care Practices across the Timeline

Discussion

The study revealed that patients' self-care sub domain variable proportion such as physical activities, healthy eating, monitoring blood glucose, compliance with medication and risk reduction behavior was low in the baseline. At the immediate post-intervention, the respondents' physical activities had a mean of 8.83 with SD of 3.65 ; healthy eating 9.03 with SD of 3.72 ; monitoring blood glucose activities 10.70 with SD of 4.3 ; compliance with

medication activities 12.40 with SD of 4.35; risk reduction 12.17 with SD of 4.50; and foot care 11.27 with SD of 5.03. There was significant difference in the mean scores and the effect size computed indicating the magnitude of the differences in means between baseline and immediate post intervention. Mons, et al. (2013) confirmed the efficacy of telephone intervention, compared to in-person intervention for glycosylated hemoglobin control. Azemat, Pedram and Shadan (2018) showed that both mobile phone text messaging (SMS) and nurse-led telephone follow-up caused a significant improvement in adherence to the diabetic diet. Bell et al. (2012) reported that mobile phone-based video messages for diabetic self-care have a positive effect on blood sugar control. According to the results of a study by Shakerzadeh et al. (2015), mobile phones have an effective role in different aspects of diabetes management, including blood sugar and HbA1C control, adherence to diet and drug regimen, regular exercise, and improved quality of life.

The study also revealed that at 6th week of follow-up, the respondents' physical activities had a mean of 11.13 with SD of 0.97; healthy eating 11.27 with SD of 0.69; monitoring blood glucose activities 13.50 with SD of 1.25; compliance with medication activities 14.03 with SD of 1.07; risk reduction 13.93 with SD of 1.34; and foot care 13.83 with SD of 1.34. There was significant difference in the mean scores and the effect size computed indicating the magnitude of the differences in means between baseline and 6th week follow-up was significant.

Conclusion

The study concluded that periodic telephone messages on diabetics positively influenced performance of self-care practices which are very vital in achieving and sustaining optimal HBA1c and blood glucose levels among patients with T2DM positively. This was demonstrated at the immediate post-intervention and 6th week follow-up.

Recommendations

1. Doctors and nurses should include short messages on diabetes to patients as a reminder to focus better self-care practices.
2. Policy-makers and health care administrators should use informational and communicational technology to follow up, train, control, and evaluate the self-care status of patients with chronic diseases in the health care system.



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