

# Role of SMS-Based Psycho-Education on Attitude To Genetic Counselling And Cancer-Risk Perception Among Relative of Persons Living With Cancer in Ibadan, Nigeria

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**ABSTRACT:** This study investigated influence of psycho-education on attitude to genetic counselling and cancer risk perception among relatives of persons living with cancer in Ibadan, Oyo state. The design adopted in this study was pretest and posttest control group design. A total of one hundred and one persons were purposively selected and participated in the first phase, while only forty-four persons qualified for the second phase of the study representing 22males (50%) and 22females (50%) participants were randomly selected into experimental and control groups of the study.

Instruments used were attitude to genetic counselling scale developed by Adejumo, A.O with reported Chronbach's alpha of  $\alpha=0.59$ ,  $\bar{x}=12.46\pm 4.14$ , in this study a Chronbach's alpha of  $\alpha=0.77$  was obtained,  $\bar{x}=17.11\pm 3.18$ , and cancer risk perception scale by Lesley A., D., Mark S., & Justin H.P (2009) with reported Chronbach's alpha of  $\alpha=0.82$ , in this study, Chronbach's alpha of  $\alpha=0.82$  was obtained,  $\bar{x}=36.42\pm 7.19$ .

Six Hypotheses were formulated, the result of the first hypothesis showed that exposure to psycho-education boosted the level attitude towards genetic counselling favourably ( $t(43)=47.84; p<.001$ ), (Mean = 17.57; S.D = 3.14), than before exposure to psycho-education, (Mean = 15.00; S.D = 2.08). As regards cancer risk perception, it is shown that psycho-education boosted the level of cancer risk perception ( $t(43)=63.98, p<.001$ ), (Mean = 35.71; S.D= 3.70) than before exposure to psycho-education (Mean = 3.93; S.D = 3.93).

Hypothesis two showed that there is significant difference between experimental and control group on genetic counselling ( $t(42) = 12.46; p<.001$ ), also there is also significant differences between experimental group and control group on cancer risk perception ( $t(42) = 5.39; p<.001$ ).

Hypothesis three showed that sex had no significant main effect on attitude to genetic counselling [ $F(1, 15) = 5.76; P>.05$ ] and cancer risk perception [ $F(1, 15) = .96; P>.05$ ]. Also, educational qualification had no significant main effect on attitude to genetic counselling [ $F(1, 15) = 2.77; P>.05$ ] and cancer risk perception [ $F(3, 15) = 1.69; P>.05$ ]. In addition, sex and educational qualification was found to have no significant interactive effect on cancer risk perception [ $F(3, 15) = 16.40; P>.05$ ]. However, sex and educational qualification was found to have significant interactive effect on attitude towards genetic counselling [ $F(2, 15) = 4.71; P>.05$ ].

Hypothesis four shows marital status had no significant effect on attitude to genetic counselling [ $F(3, 40) = 1.766; P>.05$ ], and on cancer risk perception ( $3, 40) = .261; P>.05$ ]

Hypothesis five shows age had no significant effect on attitude to genetic counselling ( $t(42)=1.07; P>.05$ ), and on cancer risk perception ( $t(42) = 1.25; P>.05$ ), Hypothesis six shows number of visits to hospital had no significant effect on attitude to genetic counselling [ $F(3, 40)= 1.174; P>.05$ ].

The study concluded that there was a predictive influence of SMS-based psycho-education on attitude to genetic counselling and cancer risk perception, and suggested that SMS-based psycho-education should be incorporate in the treatment plan. The study therefore recommended that the potent of the intervention should be tested on other dependable variables using the same mode of psycho-education i.e. SMS-based for future research.

**Keywords:** SMS-based Psycho-education, Attitude to Genetic Counselling, Cancer risk perception

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## INTRODUCTION

**BACKGROUND OF STUDY:** Cancer is a chronic and life-changing illness, as patients suffer from depression, anxiety, exhaustion, cognitive changes, pain, sleep disruption and financial concerns among other psychosocial side effects. While these symptoms may arise on their own, they regularly co-occur. Not only the patients, but also their relatives, coworkers, and associates are affected by these symptoms. Only if the treatment side effects and complications associated with a cancer diagnosis are treated and controlled, in addition to the disease itself, can cancer treatment be deemed effective.

Different authors and researchers have defined cancer differently, but the World Health Organization (WHO) defines it as a group of diseases characterized by irregular cellular growth. Similarly, cancer is viewed as unrestrained escalation and spread of pathological cells (Cancer Facts and Figures, 2017). Furthermore, the two definitions stress the fact that cancer can spread beyond its normal borders, invading adjacent parts of the body and/or spreading to other organs, and other commonly used terms include neoplasm and malignant tumors.

Cancer can affect virtually any part of the body and has a variety of anatomic and molecular subtypes, each requiring unique treatment. Furthermore, not all cancers can spread to other parts of the body through lymph or blood, but it can take many different forms, including cervical, ovarian, breast, lung, blood cancer, prostate cancer, and many others. Men are more likely to develop prostate, lung, stomach, liver, and colorectal cancers, while women are more likely to develop lung, cervix, colorectal, stomach, and breast cancers ([www.who.int/cancer/ng](http://www.who.int/cancer/ng)).

Cancer has no borders, and it is the second leading cause of death in developed countries, as well as one of the top three causes of death among adults in developing countries, including Nigeria. Cancer is responsible for 12.5 percent of all deaths, which is higher than the number of deaths caused by HIV/AIDS, tuberculosis, and malaria combined, and it is a global public health problem (Global Action against Cancer, 2005). Furthermore, cancer is the world's second leading cause of death, with 8.8 million deaths recorded in 2015. By 2035, it is expected that the number of newly diagnosed cancer cases will have risen to 24 million each year (GLOBACAN, 2012). The fastest-growing countries are emerging and newly industrialized, and further research is needed to combat this scourge. In certain Western nations, on the other hand, where people are avoiding cigarettes and embracing healthy lifestyles, the relative rise is the lowest. In the next 20 years, an ever-increasing proportion of the world's elderly will see a nearly 50% rise in new cancer cases; but, if current smoking rates and the acceptance of unhealthy lifestyles continue, the increase may be much greater (Global Action Against Cancer, 2005).

Cancer is one of Nigeria's leading causes of death and it is very sad that a large number of people are suffering from clinical symptoms of the disease and are unaware that it is the disease that is slowly destroying their lives. The occurrence and damaging effects of cancer in Nigeria cannot be overstated. The incidences of cancer in Nigeria are unclear, owing to a lack of data or under-reporting. This isn't just happening in Nigeria; it's happening all over Africa. Just 1% of cancer registry literature updates came from Africa, compared to 34% and 42% from Europe and Asia, respectively, in a review of global cancer registry literature updates (Abdulkareem, 2009). This is partially due to outdated population estimates, which make age-specific incidence figures either difficult to obtain or inaccurate if they are available. A significant number of people also do not seek orthodox medical attention and are thus undocumented. In Nigeria, however, there are 11 cancer registries located in different tertiary hospitals throughout the country. Most registries are underfunded, and they all generate hospital-based results, with the exception of The Ibadan Cancer Registry (ICR) (Abdulkareem, 2009).

Furthermore, the Ibadan Cancer Registry 1960-1969 (ICR) recorded a higher incidence of cancer in females with age-standardized rates of 105.1 per 100,000 females and 78 per 100,000 males in 1960, and in 1978, 74.5 and 65.9 per 100,000 female and males were reported, respectively (Abdulkareem, 2009). Similarly, data from the Ibadan registry from 2001 to 2005 indicates an increase in cancer incidence of 81.6 and 115.1 per 100,000 male and female, respectively, with 65.9% and 34.1 percent in females and males.

According to recent statistics, between 30 and 50 percent of cancer deaths may be avoided by altering or eliminating key risk factors such as limiting alcohol intake, avoiding tobacco products, maintaining a healthy body weight, exercising regularly, and seeking genetic counselling to resolve disease risk factors ([www.who.int/cancer/en/](http://www.who.int/cancer/en/)). Efficient and accessible services in early diagnosis, screening, treatment, and palliative care are also required to minimize the severe impairment, pain, and deaths caused by cancer around the world. Palliative care, which focuses on improving patients' and their families' quality of life, is an important part of cancer treatment which is an avenue this study wants to leverage on to address cancer risk perceptions and attitude to genetic counselling among relatives of persons living with cancers.

Women with breast cancer who attended a weekly support group and benefited from sharing their experiences with patients who had similar experiences were published in a landmark study by Spiegel, Bloom, and Yalom (1981). People who joined the support group had lower mood disorder levels and used less maladaptive coping mechanisms than those who did not. Sharing experiences also helps to reduce

the stigma associated with cancer diagnosis and social isolation (Weis, 2003). The focus of psychosocial support for cancer patients is generally on specific clinical issues such as anxiety, depression, exhaustion, health-related quality of life, and pain.

Typically, these interventions aim to provide effective psychosocial supports that are brief, goal-oriented, and targeted at specific clinical outcomes. Psychosocial interventions may help cancer patients, according to a meta-analysis of controlled outcome research (Rehse & Purkrop, 2003). Other research has found that psychosocial interventions using a cognitive-behavioral therapy (CBT) approach are effective in reducing depressive and anxiety symptoms, as well as enhancing cancer patients' quality of life (Edmonds, Lockwood, & Cunningham, 1999; Kissane et al., 2003; Larson et al., 2000; Lev et al., 2001). These interventions were delivered in either group or individually, but the type of the interventions did not appear to be a significant factor in their efficacy (Rehse, & Pukrop, 2003).

This study focuses on relatives of cancer patients and how they can truly benefit from psycho-education interventions in changing their attitudes toward genetic counselling. These interventions are designed to increase understanding and knowledge about cancer and issues related rather than learning techniques to reduce anxiety and cope with stress or pain, which is the primary focus of most psychosocial interventions. The famous adage "prevention is better than cure" applies to cancer cases as well, as most diagnosable cancers can be avoided with genetic testing and counselling but few research on cancer patients' relatives have been performed in the world, and Nigeria in particular. Although this may be due to the fact that genetic testing and counselling is a relatively new profession compared to medicine and nursing, for example. It's worrying that most cancer patients' families ignore or are ignorant of the value of genetic testing and counseling in cancer mitigation, prevention, and early detection. Even the few educated people who are aware of it rarely go for genetic cancer screening or testing, let alone genetic counselling. This could be due to a variety of factors, including psychological feelings associated with it, a lack of screening or diagnostic centers in the country, the few that are available have only recently opened and the cost of genetic testing and treatment are another factor that made cancer patients vulnerable to death.

The National Society of Genetic Counselors describes genetic counselling as "a way of assisting people in recognizing and adapting to the psychological, familial and medical effects of inherited contributions to disease" (McKinnon et al., 1997). Furthermore, the American Society of Human Genetics construe genetic counselling as a mechanism of communication that addresses the individual issues in relation with the incidence or possibility of occurrence of a genetic disease in a family (American Society of Clinical Oncology, 2003).

Against this background, attitude to genetic counselling in this study has been construed as a set of beliefs, emotions, and behaviors toward genetic screening and counselling, especially in respect to relatives of persons living with cancers. While attitudes are enduring, they can also change. Attitudes are often the result of experience or upbringing, and they can have a powerful influence on behavior. People who have a personal and/or family history (maternal lineage) with characteristics suggestive of hereditary cancers are considered candidates for cancer risk assessment (Olopade, & Pichert, 2001). Before being tested, such applicants receive genetic education and counseling to help them make informed choices and adjust to the risk or disease. When a risk evaluation indicates the occurrence of an inherited cancer disease for which specific genes have been identified, genetic testing is recommended or provided (Nelson et al., 2014). The following are relevant criteria for conducting the test: (i) a person's personal or family history indicates a hereditary cancer risk condition, (ii) the test outcome may be interpreted, and (iii) testing can affect medical management. In general, genetic testing is done where there is evidence of a hereditary susceptibility that has not been checked or identified as having a mutation, as well as in families with a known deleterious condition (Oluwasola & Odukogbe, 2017). Cancer risk perceptions refer to people's beliefs about their vulnerability to cancer and their judgments about the probability of benefit from interventions (BUPA, UK foundation fund cancer prevention Initiative, 2015). Risk perceptions of cancer are therefore an essential component of health behavior change for cancer perception. Understanding the behaviors that will reduce your cancer risk is the first step in making good choices and improving your actions. However, although certain cancer risk factors (such as smoking) are well-known, others (such as alcohol) are not (BUPA, 2015).

Research attention has focused more on cancer itself as disease, and its effects on those directly affected, while less attention has been devoted to explaining the causes and how to prevent cancers in the view of advancement in technology to identify genes and familial risks in developing cancers among relatives of persons living with cancer.

The focus of this study is to determine the role of SMS-based psycho-education on attitude to genetic counselling among the relatives of cancer patients. The aim of the study is to educate relatives of persons living with cancers on the need to seek genetic counselling to know the level of cancer risk within the family. However, psycho-education is an evidence-based therapeutic intervention for patients and their loved ones that provide information and support to better understand and cope with illness. In this study, the intervention was through short message service (SMS), unlike the face to face therapeutic sessions. It consists of

two modules, module one centred on health information about cancer such as meaning, causes, types, prevention and available treatment options, while the second module was based on Albert Ellis Rational Emotive Behavioral Therapy (REBT) techniques.

### STATEMENT OF HYPOTHESES

1. Attitude towards genetic counselling and cancer risk perception will be highest after treatment than before treatment among the relatives of persons living cancer patients in Ibadan.
2. Participants who receive SMS-based psycho-education will score significantly higher compare to those who do not receive SMS-based psycho-education among the relatives of persons living cancer patients in Ibadan.
3. Female relatives of cancer patients with tertiary educational qualification will significantly report more favourable attitude to genetic counselling and higher cancer risk perception.
4. Married relatives of cancer patients will significantly report higher cancer risk perception and favourable attitude towards genetic counselling than single, divorced or separated relatives of cancer patients.
5. Older relative' cancer patients will significantly report higher cancer risk perception and favourable attitude towards genetic counselling than younger relatives cancer patients.
6. Relatives of cancer patients with high number of visits to the hospital will significantly report higher cancer risk perception and attitude towards genetic counselling than those with low number of visits to the hospital.

### METHODS

**DESIGN AND PARTICIPANTS:** This study adopted pretest and posttest control group research design. A total of one hundred and one persons were purposively selected and participated in the first phase of the study, while only forty-four persons qualified using inclusion criteria for the posttest representing 22males and 22females participated and were randomly selected into experimental and control groups. The Participants were relatives of persons living with cancer within the age range of 18-76years ( $M=37.05$ ;  $SD=11.57$ ) drawn from the radiation oncology department, University College Hospital (UCH), Ibadan, Nigeria.

**SETTING:** This study took place in Ibadan, Oyo State, known as largest city in West Africa. Data obtained from Radiation Oncology Department, University College Hospital (UCH), Ibadan North LGA, Oyo State. The study was conducted in UCH which is adjudged advantageous for two reasons, UCH was the first teaching hospital in Nigeria and has the most reliable cancer register in Nigeria even in

recent time, it is still viewed to have high level of patronage and expertise for a tertiary hospital in Nigeria.

**MEASURES AND INSTRUMENTS:** Attitude to genetic counseling (AGC) developed by Adejumo A.O. (2018), was used to measure participants attitude to genetic counselling. It contained 8 items with sample items including. ‘No matter the obstacles, I support genetic counselling’. Responses were scaled in a 4-point Likert form with ‘strongly Disagree’ as 1 and ‘Strongly Agree’ as 4. Negative items were reversed in scoring. An individual could score between 8 and 36 on the scale. Higher scores mean a more positive attitude towards genetic counselling. The developer reported internal consistency of Chronbach’s alpha of  $\alpha = 0.59$ , with mean score of  $\bar{x}=12.46 \pm 4.14$ . In this present study, A Chronbach’s alpha of  $\alpha = 0.77$  was obtained, with mean score of  $\bar{x}=17.11 \pm 3.18$ .

Perceived vulnerability to disease scale (PVDS) developed by Lesley A., D., Mark S., & Justin H. P (2009), was used to measure cancer risk perception. The scale consists of 15 items in which six were reverse items (3, 5, 11, 12, 13, &14). The developer reported an acceptable level of internal consistency (after reverse-scoring of items indicated above): Cronbach’s alpha = .82. The respondents expressed their degree of agreement on a 5-point Likert scale type ranged from 5 strongly agreed and 1 strongly disagreed. In this present study, A Chronbach’s alpha of  $\alpha = 0.82$  was obtained, with mean score of  $\bar{x}=36.42 \pm 7.19$ .

### PROCEDURE

Ethical approval was sought from the hospital Institute for Advanced Medical Research and Training (IAMRAT) with approval number UI/EU/18/0141, before I was given permission to access patients and their relatives at the department of radiation oncology, University College Hospital Ibadan. The questionnaire was administered to the participants after informed consent form was signed. A total number of 120 questionnaires were administered and 101 questionnaires were returned and analyzed in this study in the first phase, while 44 persons qualified using inclusion criteria for the second phase.

### ETHICAL CONSIDERATION

1. **VOLUNTARINESS & INFORMED CONSENT:** Participation in this study was voluntary and participants were free to withdraw from the study at any point in time without any penalty. Informed consent was obtained at the pretest and posttest phases of the study from the participants and only those who are willing were enrolled for the study.
2. **CONFIDENTIALITY AND PRIVACY:** The participants were duly informed that all responses obtained would be used for research purpose only and would remain highly confidential. No names were obtained

from participants on the questionnaire and all completed questionnaire were stored securely with access to data only given to the research team.

**3. RISK/BENEFIT RATIO:** The first phase of study causes little or no harms to the respondents as it only survey. The second phase of the study provides SMS-based psycho-education intervention aimed at changing attitude to genetic counselling and cancer risk perception of the participants. The participants benefit from the psycho-education intervention of the study which assists them to make informed decision about genetic counselling and reduce their cancer risk perception in their families.

**4. TRANSLATION OF PROTOCOL TO THE LOCAL LANGUAGE:** The research instruments were translated to local language, because of those who cannot read or understand English language.

**5. DEBRIEFING OF PARTICIPANTS:** Following the completion of the experiment, participants were debriefed on the aim of the study, hypotheses being tested and the methods used by the researcher.

**6. DISCLOSURE STATEMENT:** No potential conflict of interest

## DATA ANALYSIS

Hypotheses three and four were analyzed with the use of appropriate statistical tools. One-samples T-test and Independent T-test were used to analyzed hypotheses one and two, hypothesis three and four were analyzed with Multivariate Analysis of Variance (MANOVA), and One-Way Analysis of variance (ANOVA), while hypotheses five and six were analyzed with T-test Independent and One-Way Analysis of Variance (ANOVA).

## RESULT

Table 1 presents the descriptive results of socio-demographic information of respondents. As regards age distribution, more of the respondents 34 (33.7%) were between 30 and 39 years old, 25 (24.8%) were between 40 and 49 years old, 21 (20.8%) were between 20 and 29 years old, 15 (14.9%) were 50 years and above, while the other 6 (5.9%) indicated to be less than 20 years old. Also, sex distribution revealed that more of the participants 53 (52.5%) were females, while the other 48 (47.5%) were males. Further, marital status distribution revealed that more of the relatives of cancer patients 62 (61.4%) indicated to be married, 27 (26.7%) were single, 7 (6.9%) were divorced, while the other 5 (5%) were widowed.

**Table 1.**  
Descriptive Statistics of Respondent's Socio-Demographic Information.

Variable	Frequency (%)	Genetic counselling Mean (SD)	P	Cancer risk perception Mean (SD)	P
<b>Age</b>					>.05
Less than 20 years	6(5.9)	19.17(1.94)	>.05	36.67(6.47)	
20-29 years	21(20.8)	16.95(3.44)		37.19(6.85)	
30-39 years	34(33.7)	17.24(2.67)		35.71(6.51)	
40-49 years	25(24.8)	16.88(3.03)		35.36(7.84)	
50 years &>	15(14.9)	16.60(4.37)		38.60(8.51)	
<b>Sex</b>					>.05
Male	48(47.5)	17.25(3.47)	>.05	35.81(6.27)	
Female	53(52.5)	16.98(2.92)		36.96(7.95)	
<b>Marital Status</b>					<.05
Single	27(26.7)	17.70(17.58)	<.05	38.56(5.96)	
Married	62(61.4)	17.58(2.85)		35.00(7.43)	
Divorced	7(6.9)	13.86(2.55)		36.86(3.63)	
Widowed	5(5)	12.60(2.61)		41.80(9.98)	
<b>Edu. Qual.</b>					>.05
SSCE	9(8.9)	17.33(4.47)	>.05	36.11(5.80)	
NCE/OND	22(21.8)	17.00(2.51)		37.73(7.75)	
HND/University	52(51.5)	17.14(3.23)		35.94(7.28)	
Postgraduate	18(17.8)	17.06(3.32)		36.33(7.19)	
<b>Number of visit/week</b>					>.05
Less than 5	17(16.8)	18.06(2.88)	>.05	35.82(6.52)	
5-9 visits	37(36.6)	17.11(3.26)		37.27(7.15)	
10-14 visits	27(26.7)	16.67(3.09)		36.52(6.88)	
15-19 visits	8(7.9)	17.00(3.70)		33.86(7.53)	
20 visits and above	12(11.9)	16.83(3.46)		36.08(9.20)	
<b>Total</b>	<b>101</b>	<b>17.11(3.18)</b>		<b>36.42(7.19)</b>	

From Table 4.1 as well, more of the respondents 52 (51.5%) indicated to be HND/ University degree holders, 22 (21.8%) were NCE/OND holders, 18 (17.8%) were postgraduate certificate holders, while the other 9 (8.9%) were SSCE holders. Finally, frequency of visitation revealed that more of the respondents 37 (36.6%) visits the hospital between 5 and 9 times, 27 (26.7%) visits the hospital between 10 and 14 times, 17 (16.8%) visits the hospital less than 5 times, 12 (11.9%) visits the hospital more than 20 times, while the other 8 (7.9%) visits the hospital between 15 and 19 times.

### INTER-CORRELATION BETWEEN VARIABLES OF THE STUDY:

Table 2 presents results on the relationship between variables of the study. It is shown on Table 2 that attitude towards genetic counselling had no significant relationship with cancer risk perception ( $r = -.06; P > .05$ ), educational qualification ( $r = -.01; P > .05$ ), number of visit ( $r = -.16; P > .05$ ) and age ( $r = -.16; P > .05$ ). Also, cancer risk perception

had no significant relationship with educational qualification ( $r = -.04; P > .05$ ), number of visits ( $r = -.04; P > .05$ ) and age ( $r = -.01; P > .05$ ). However, educational qualification had significant positive relationship with number of visits ( $r = .33; P < .01$ ) and age ( $r = .42; P < .01$ ). Finally, there exists significant positive relationship between number of visits to hospital and age ( $r = .49; P < .01$ ).

### HYPOTHESES TESTING

Hypothesis one stated that attitude towards genetic counselling and cancer risk perception will be highest after treatment than before treatment among relatives of persons living with cancer in Ibadan. This was tested using one-sample t-test and the result is presented on Table 3.

The result in table 3 above shows that exposure to psycho-education boosted the level of attitude towards genetic counselling favourably ( $t(43) = 47.84; p < .001$ ). Attitude to genetic counselling increased significantly after exposure to

**Table 2.**

Zero-Order Correlation Matrix Table Showing the Relationship between Attitude to Genetic Counseling, Cancer Risk Perception, and Demographic Factors.

SN	Variable	Mean	SD	1	2	3	4	5
1	Attitude to genetic counselling	17.11	3.18	-				
2	Cancer risk perception	36.42	7.19	-0.1	-			
3	Educational qualification	2.78	0.84	-0	-0	-		
4	Number of visits to hospital	10.26	7.26	-0.2	-0	.33**	-	
5	Age	37.06	11.6	-0.2	-0	.42**	.49**	-

\* Significant at 0.05 level of significance

\*\* Significant at 0.01 level of significance

**Table 3.**

One Sample T-Test Showing Results Difference between Pre-Test and Post-Test of Psycho-Education in Attitude towards Genetic Counselling and Cancer Risk Perception.

Genetic counselling	N	Mean	SD	T	df	P
Pre-test	44	15	2.1			
				47.8	43	<.01
Post-test	44	17.57	3.1			
<b>Cancer Risk Perception</b>						
Pre-test	44	32.05	3.9			
				64	43	<.01
Post-test	44	35.71	3.7			

**Table 4.**

Summary of T-test for Independent Samples Showing Difference in Exposure to Psycho-Education in Genetic Counselling and Cancer Risk Perception.

DV	Genetic counselling	N	Mean	SD	t	df	P
	Control	22	14.82	1.7			
Genetic Counselling					12.5	42	<.01
	Experimental	22	20.32	1.2			
	<b>Cancer Risk Perception</b>						
	Control	22	33.36	2.8			
Cancer Risk Perception					5.39	42	<.01
	Experimental	22	38.05	2.9			

psycho-education (Mean = 17.57; S.D = 3.14) than before exposure to psycho-education (Mean = 15.00, S.D = 2.08). As regards cancer risk perception, it is shown that psycho-education boosted the level of cancer risk perception ( $t(43) = 63.98, p < .001$ ). Cancer risk perception increased significantly after exposure to psycho-education (Mean = 35.71; S.D = 3.70) than before exposure to psycho-education (Mean = 3.93; S.D = 3.93). This confirms the stated hypothesis, hence was retained in this study.

Hypothesis two stated that participants who receive SMS-based psycho-education will score significantly higher compare to those who do not receive SMS-based psycho-education. This was tested using t-test for independent samples and the result is presented on Table 4;

The result in table 4 above shows that result on the efficacy of psycho-education in genetic counselling and cancer risk perception. As regards attitude towards genetic counselling, it is shown that there exists significant difference between experimental and control group in genetic counselling ( $t(42) = 12.46; p < .001$ ). Attitude towards genetic counseling is more favorable among relatives of cancer patients who received psycho-education (Mean = 20.32; SD = 1.21) than those who did not receive psycho-education (Mean = 14.82; SD = 1.68).

As regards cancer risk perception, it is shown that there exists significant difference between experimental and control group in cancer risk perception ( $t(42) = 5.39; p < .001$ ). Relatives of cancer patients who received psycho-education reported increased perception of cancer risk (Mean = 38.05; SD = 2.92) than those who did not receive psycho-education (Mean = 33.36; SD = 2.84). This confirms the stated hypothesis, hence was retained in this study.

Hypothesis three stated that female relatives of cancer patients with tertiary educational qualification will significantly report more favorable attitude to genetic counselling and higher cancer risk perception. This was tested using 2x4Multivariate Analysis of Variance (MANOVA) and the result is presented on Table 5.

Table 5 above presents results on the main and interactive effect of sex and educational qualification on attitude towards genetic counselling and cancer risk perception. It is shown that sex had no significant main effect on attitude to genetic counselling [ $F(1, 15) = 5.76; P > .05$ ] and cancer risk perception [ $F(1, 15) = .96; P > .05$ ]. Also, educational qualification had no significant main effect on attitude to genetic counselling [ $F(1, 15) = 2.77; P > .05$ ] and cancer risk perception [ $F(3, 15) = 1.69; P > .05$ ]. In addition, sex and educational qualification was found to have no significant interactive effect on cancer risk perception [ $F(3, 15) = 16.40; P > .05$ ]. However, sex and educational qualification was found to have significant interactive effect on attitude towards genetic counselling [ $F(2, 15) = 4.71; P > .05$ ]. Descriptive analysis of the interactive effect of sex and educational qualification on attitude towards genetic counselling is presented on Table 6;

From Table 6, it is shown that attitude towards genetic counselling is highest among male relatives of cancer patients with postgraduate educational qualification (Mean = 16.00; SD = 1.01) and female relatives of cancer patients with NCE/ND educational qualification (Mean = 16.00; SD = 1.01). However, attitude towards genetic counseling is less favorable among female relatives of cancer patients with postgraduate educational qualification (Mean = 11.50; SD = 1.01).

**Table 5.**

2x4 MANOVA Showing the Effect of Sex and Educational Qualification on Attitude towards Genetic Counselling and Cancer Risk Perception.

Tests of Between-Subjects Effects						
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	P
Sex (A)	Genetic counselling	5.76	1	5.76	2.9	>.05
	Cancer risk perception	0.96	1	0.96	0.1	>.05
Educational qualification (B)	Genetic counselling	8.31	3	2.77	1.4	>.05
	Cancer risk perception	5.06	3	1.69	0.2	>.05
A * B	Genetic counselling	19.03	2	9.52	4.7	<.05
	Cancer risk perception	12.8	2	6.4	0.6	>.05
Error	Genetic counselling	30.33	15	2.02		
	Cancer risk perception	151	15	10.07		
Total	Genetic counselling	4890	22			
	Cancer risk perception	24658	22			
Corrected Total	Genetic counselling	59.27	21			
	Cancer risk perception	169.09	21			

Hypothesis four which stated that married relative of cancer patients will significantly report higher cancer risk perception and favorable attitude towards genetic counselling than single, divorced or separated cancer patients. This was tested using One-Way Analysis of Variance (ANOVA) and the result is presented on Table 7;

Table 7 presents results on the effect of marital status on attitude towards genetic counselling and cancer risk perception. It is shown that marital status had no significant effect on attitude towards genetic counselling [F (3, 40) = 1.766; P>.05] and cancer risk perception [F (3, 40) = .261; P>.05]. This negates the stated hypothesis, hence was rejected in this study.

Hypothesis five which stated that older relative' cancer patients will significantly report higher cancer risk perception and favorable attitude towards genetic counselling than younger relatives cancer patients. This was tested using t-test for independent samples and the result is presented on Table 8;

The result in table 8 above shows that result on the influence of age on genetic counselling and cancer risk perception. It is shown that there exists no significant difference of age in attitude towards genetic counselling (t (42)= 1.07; p>.05) and cancer risk perception (t (42)= 1.25; p>.05). This negates the stated hypothesis.

Hypothesis six stated that relatives of cancer patients with high number of visits to the hospital will significantly report higher cancer risk perception and attitude towards genetic counselling than those with low number of visits to the hospital. This was tested using One-Way Analysis of Variance (ANOVA) and the result is presented on Table 9;

Table 9 presents results on the effect of number of visits to the hospital on attitude towards genetic counselling and cancer risk perception. It is shown that number of visits to the hospital had no significant effect on attitude towards genetic counselling [F (3, 40) = 1.653 P>.05] and cancer risk perception [F (3, 40) = 1.174; P>.05]. This negates the stated hypothesis, hence was rejected in this study.

**Table 6.**

Descriptive Result of the Interactive Effect of Sex and Educational Qualification on Genetic Counseling.

Dependent Variable	Sex	Edu qualification	Mean	Std. Error
Attitude to genetic counselling	Male	SSCE	15	1.006
		NCE/ND	15.5	1.006
		HND/University	14.667	0.581
		Postgraduate	16	1.006
	Female	SSCE	-	-
		NCE/ND	16	1.006
		HND/University	15	0.581
		Postgraduate	11.5	1.006

**Table 7.**

One-Way ANOVA Summary Table Showing the Effect of Marital Status on Attitude to Genetic Counselling and Cancer Risk Perception.

ANOVA		Sum of Squares	df	Mean Square	F	Sig.
Attitude to genetic counselling	Between Groups	49.454	3	16.485	1.766	0.169
	Within Groups	373.341	40	9.334		
	Total	422.795	43			
Cancer risk perception	Between Groups	11.312	3	3.771	0.261	0.853
	Within Groups	577.847	40	14.446		
	Total	589.159	43			

**Table 8.**

Summary of T-test for Independent Samples Showing Difference in Age in Attitude to Genetic Counselling and Cancer Risk Perception.

DV	Age	N	Mean	SD	t	df	P
Genetic Counselling	Old	21	18.1	3.5	1.1	42	>.05
	Young	23	17.09	2.8			
Cancer Risk Perception	Old	21	36.43	4.1	1.3	42	>.05
	Young	23	35.04	3.2			



**Table 9.**

One-Way ANOVA Summary Table Showing the Effect of Number of Visits to the Hospital on Attitude to Genetic Counselling and Cancer Risk Perception.

ANOVA						
DV		Sum of Squares	df	Mean Square	F	Sig.
Genetic counselling	Between Groups	46.645	3	15.548	1.653	0.192
	Within Groups	376.15	40	9.404		
	Total	422.795	43			
Cancer risk perception	Between Groups	47.676	3	15.892	1.174	0.332
	Within Groups	541.483	40	13.537		
	Total	589.159	43			

## DISCUSSION

Hypothesis 1 which stated that attitude towards genetic counselling and cancer risk perception will be highest after treatment than before treatment among relatives of persons living with cancer in Ibadan was confirmed in the result in Table 4.3. Andersen (1992) confirmed this finding in an analysis of the impact of psycho-educational treatments for cancer patients at different stages (initial learning about the diagnosis, early treatment, and post treatment). According to the results, these approaches are beneficial because they boost patient awareness, show them how to cope with stressors through positive emotional states, and teach active behavioral techniques. A combination of education and specific methods to teach close relatives of cancer patients about the relevance of genetic counseling, especially those with a high cancer-risk perception and a family history of cancer.

Mahendran et al. (2017) conducted a quasi-experimental mixed-methods study to assess a brief pilot psycho-educational support group intervention for family caregivers of cancer patients, which backed up this result. Family caregivers of cancer patients often experience decreased quality of life (QOL) and emotional distress as a result of their care-giving duties, which may have an effect on the quality of care given to their patients. The findings show that, while QOL in the control group is stable, it increased in the intervention group, both in terms of overall QOL and burden. The levels of anxiety and depression in both groups were not significantly different.

Dieng et al. (2018) found similar findings in a study that looked at the role of psycho-educational intervention for people at high risk of developing another melanoma: a pilot randomized controlled trial. 24 participants were recruited and randomly allocated 1:1 to the intervention (a psycho-educational booklet, a Cancer Council booklet on malignancy, and up to five phone-based sessions with a psychologist) or normal treatment (a psycho-educational booklet, a Cancer Council booklet on malignancy, and up to five phone-based sessions with a psychologist) (Cancer Council booklet only). At baseline, 1 and 6 months, feasibility, acceptability, fear of melanoma reappearance, and secondary psychosocial results were evaluated.

The findings revealed that all intervention components, especially the telephone-based therapeutic sessions, were rated extremely high in terms of satisfaction and perceived benefits. The intervention group classified the importance of knowledge and help given in the experiment as 'high,' with a mean score of 4.6 out of 5 (SD=0.9) and 4.2 (SD=1.2) for the control group. The intervention was feasible and sufficient for promoting psychological well-being. People with melanoma have a recognized need for timely access to reliable, evidence-based psychological treatment. The intervention is designed to naturally address this need in a clinical environment that is acceptable to patients and health professionals.

Hypothesis 2 which stated that participants who receive SMS-based psycho-education will score significantly higher compare to those who do not receive SMS-based psycho-education was confirmed in the result in Table 4.4. This result was supported by the findings of Wargny et al. (2018) conducted a clinical trial in Senegal to investigate the effect of SMS-based intervention in type 2 diabetes. SMS sending was related to better glycemic control in people with type 2 diabetes in Senegal, according to the findings. Medical interventions using mobile phones should be developed to ease interactions between people with diabetes and health teams, as SMS has a high broadcasting rate in low-middle-income countries where medical investment is scarce. This could reduce diabetes-related complications. With a median difference of 0.4 percent, quartiles (1.0; 0.3) versus 0.2 percent (-0.5; 0.8), respectively, the HbA1c shift from M0 to M3 in centre S was better than in centre P (p=0.0038). Following the termination of SMS in center S, HbA1c decreased over the course of three months and was restored in center P.

The results of Aguilera and Munoz (2011) on text messaging as an alternative to CBT in low-income populations: a usability and feasibility pilot study backed up this conclusion. According to the findings, after two months of text messaging, 10 of the 12 patients received feedback on the text-messaging supplement. By agreeing or strongly agreeing with that statement, 9 out of 10 patients said text messaging made them feel more connected to their colleagues and therapists. Just two patients (20%) responded

“neutral,” while the majority of patients (80%; n=8) agreed or strongly agreed that receiving text messages increased their attendance at sessions. When it came to the number of messages sent, 40% (n=4) of the patients preferred more, 60% (n=6) said they got the right amount, and no one desired less. In addition, we also looked at the response rate as well as qualitative feedback from patients about their experiences receiving messages as part of their mental health treatment as part of the usability–feasibility research. Over a period of 2–4 months (individuals started at different times), the response rate was 64.88 percent (SD 24.85 percent), with a range of 27 percent to 99 percent. The biggest downside, according to patients, is getting alerts at inappropriate times, and one person requested medication reminders and more messages with comprehensive tips in their suggestions for improvement. Although some patients were qualified to use SMS, higher age was correlated with lower rates of SMS usage prior to the study ( $r = -.59, p=.01$ ), but not with eventual use of SMS as part of the study ( $r = -.09, p=.70$ ). Patients were mostly upbeat and agreed with our assessments of SMS’s therapeutic effects. Patients indicated that receiving text messages improved their self-awareness. According to one patient, the texts “help me check in with myself,” whilst another says, “it lets me check in with myself, it’s the best thing I’ve done, besides group.” “When I was contacted by the study, I discovered that I was in a good mood when I was listening to music or talking with a woman I was interested in. one of the participants said.” “We do have control over our mood,” one patient said after receiving SMS as part of psychotherapy. They believed that receiving updates made Spanish-speaking patients feel as though someone cared for them. Depression symptoms were tested at baseline and again 1–2 months later, when the emphasis was on usability. Using the PHQ-9, we saw average ratings go from 10.1 at baseline to 8.5 at follow-up (scores of 5 indicate mild depression and scores of 10 indicate severe depression; Kroenke et al., 2001). There was no statistically meaningful difference in scores ( $p=.15$ ). In general, patients appreciated the text messaging component of treatment, and there was no statistically meaningful difference in scores ( $p=.15$ ). Patients liked the text message part of counseling in general, and they brought it up often during therapy sessions when asked about their attitude the week before. At one stage, participants were sent a message with the ability to opt out of receiving updates by replying with the word Exclude. Participants did not ask to be removed; instead, they asked to be held, saying things like “Please don’t delete me.” Several patients answered with “Yes” and “Thank you” to such texts, such as updates, even after receiving them several times.

This result contradicted Patrick et al. (2009) findings, which looked into the role of a text message-based intervention for weight loss: randomized controlled trial showed no differences in sample characteristics (i.e. sex, age, weight, and race) between the intervention and comparison groups,

except for mean age, which was 5 years higher in the intervention group.

Hypothesis 3 which stated that female relatives of cancer patients with tertiary educational qualification will significantly report more favorable attitude to genetic counselling and higher cancer risk perception in Ibadan was partially confirmed in the result in Table 4.5. It was mixed result, sex and education qualifications had no significant main effects on attitude to genetic counselling and cancer risk perception among relatives of persons living with cancer in Ibadan. Sex and education qualifications had no significant interactive effects on attitude to cancer risk perception, while sex and educational qualification had significant interactive effects on attitude to genetic counselling.

In a study of genetic knowledge and attitudes toward genetic testing among Saudi Arabian college students, Olwi et al. (2016) supported this result. A cross-sectional analysis was performed at King Abdulaziz University in Saudi Arabia with a multistage stratified sample of 920 senior university students. Genetics education, attitudes toward genetic testing, and socio-demographic data were collected using a self-administered questionnaire. According to the findings, students had a good understanding of genetics in general but ignored some genetics fundamentals. A significant number of students demonstrated support for some types of genetic testing, such as the use of abortion in the event of a serious genetic defect in an unborn child that is untreatable. The most important predictors of knowledge were faculty, sex, academic year, and various previous knowledge of genetic testing. Furthermore, Olwi et al. (2016) suggested that genetic educational initiatives aimed at teenagers could improve genetic understanding and public acceptance of genetic testing and counseling. The knowledge of genetic counselling among college students was higher than in previous studies, and their attitudes toward genetic testing and counseling were mostly positive.

In an analysis of Korean adults’ perceptions of cancer risk and cause of risk, Su YeonKye et al. (2015) found similar findings. According to the study, 59.5 percent of the respondents believed they were at risk of developing cancer. Important bivariate variations in cancer perception were observed in sex, age, education, monthly income, employment, and family history of cancer.

Hypothesis four married relatives of cancer patients will significantly report higher cancer risk perception and favorable attitude towards genetic counselling than single, divorced or separated relatives of cancer patients was not confirmed in the result in Table 4.7. This finding was substantiated by the findings of Ravi and Subhalakshmi (2015) investigated the effect of gender and marital status on cosmetic product online shopping attitudes. The findings indicate that demographic factors such as gender and marital status have a minor impact on attitudes toward online cosmetic shopping. Rather than focusing on attitude as a

single dimension, the study depicted the effect of gender and marital status on various aspects of online shopping attitude. In contrast, gender has a greater effect than marital status, but both variables have a lesser overall impact.

This finding contradicted Duke et al. (2015) research on the impact of marital status on midwives' attitudes toward objective standardized clinical examination (OSCE) and success in the examination in Nigeria's Akwalbom and Cross River states. The findings reveal that marital status and attitude are important joint predictors of midwives' OSCE success ( $f=6.74$   $p.001$ ). As a result, the inter-correlation between variables had a major effect on results, with  $r^2=0.051$ . This means that the predictor variables of attitude and marital status account for 5.1 percent of the variability in midwives' OSCE results.

The results also showed that midwives' attitudes toward OSCE and success in OSCE are unaffected by marital status. This study's results are consistent with Cuttance's (1980) findings, which showed a non-significant relationship between students' attitudes and their academic performance.

Hypothesis five older relatives of cancer patients will significantly report higher cancer risk perception and favorable attitude towards genetic counselling than younger relatives of cancer patients was not confirmed in the result in table 4.8. This finding negated the findings of in a study published in Su YeonKye et al., 2015 investigated Korean adults' views of cancer risk and cause. A higher perception of cancer risk was related to younger age and lower income (0.68, 0.69, and 0.73), respectively, while a family history of cancer was linked to a higher perception of cancer risk (0.68, 0.69, and 0.73). (0.68, 0.69, and 0.73) (2,80). Since these two factors have consistently been linked to higher risk communications, the study also discovered that being male and older were both associated with lower perceived cancer risk. The inverse relationship between age and perceived risk is comparable to previous research in the United Kingdom, which found that 35% of those aged > 65 years had a lower sense of self-risk of breast cancer than the general population, which is higher than the national average of 17%. This may be due to existing knowledge of the challenges that participants face, such as a lack of education and awareness about the risk of breast cancer in older women as a result of their age. Just 30% of women recognized that advanced age is a risk factor for breast cancer, and older women were less likely to classify risk factors correctly.

The results of Adeyemo et al. (2007) on the extent of knowledge of genetic counseling in Lagos, Nigeria: its advocacy on the inheritance of sickle cell disease, contradicted this finding. Just 20.4 percent of young adults in the 16-24 age group had heard about genetic counselling and had a favorable outlook toward it, 9.9 percent in the 25-35 age group had heard about genetic counselling, and none in the 36-45 age group had heard about it.

Hypothesis six cancer patients with high number of visits to the hospital will significantly report higher cancer risk perception and attitude towards genetic counselling than those with low number of visits to the hospital was not confirmed in the result in Table 4.9. This contradicted Ogunba & Abiodun (2017) findings on women's awareness and attitudes and their effect on antenatal care attendance in southwestern Nigeria. The findings indicate that there was a substantial association ( $r=-0.276$ ,  $p=0.000$ ) between respondents' attitudes toward antenatal treatment and clinic attendance. However, there was no important association between expertise and antenatal clinic attendance ( $r=0.055$ ,  $p=0.388$ ).

## CONCLUSION

Undoubtedly, attitude to genetic counselling and cancer-risk perception is a major challenge among relatives of cancer patients in Nigeria, although studies on attitude to genetic counselling and cancer-risk perception are very limited, however, none have simultaneously examined the role of psycho-education on attitude to genetic counselling and cancer-risk perception among relatives of persons living with cancer, indicating a vacuum in literature. The present study attempted to fill the gap by investigating the influence of the role of SMS-based psycho-education on attitude to genetic counselling and cancer-risk perception among relatives of persons living with cancer in Ibadan as samples. In support of the studied hypotheses, the findings of this present study showed, SMS-based psycho-education had a significant influence on attitude to genetic counselling and cancer-risk perception among relatives of persons living with cancer in Ibadan. More so, an oncologist should incorporate in their treatment plan the need for a clinical psychologist to give psychological assessments, diagnoses, and interventions to both patients and their relatives, also, to give psychological interventions to allay their fears that cancer diagnosis is not a death sentence has most perceived by people. These findings have practical implications for reviewing and updating clinical practice on the imperative of incorporating psycho-education on patients with a family history of cancer and their relatives on the need for genetic testing as well as genetic counselling. In contrast, less attention should be paid to the issue of gender, educational qualification, marital status, and the number of visits to the hospital in this present study, because all these demographic variables had no significant influence on attitude cancer-risk perception among relatives of cancer patients in Ibadan, except on attitude to genetic counselling. As demonstrated in this present study, SMS-based psycho-education had a significant influence on attitude to genetic counselling and cancer-risk perception just as face-to-face psycho-education, however, SMS-based psycho-education is as potent as the other forms of psychological interventions.

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