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Psychological Wellbeing of Lower-Limb Amputees in Two Nigerian Teaching Hospitals: The Role of Psychological and Demographic Factors

By

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Abstract

The role of psychological (personality factors and depression) and demographic factors (age, gender, average monthly income, and marital status) on the psychological wellbeing (PWB) of amputees was investigated. The cross-sectional study included 96 male and 16 female purposively selected below-knee amputees (age \bar{X} = 36.25) attending postoperative clinics in two Nigerian Teaching Hospitals. Regression, correlational analysis, and t-tests revealed a significant inverse relationship between PWB and openness to experience ($r = -.295$, $p < .05$), conscientiousness ($r = .249$, $p < .05$), and agreeableness ($r = -.278$, $p < .05$). A significant inverse relationship was also observed between depression and conscientiousness ($r = -.359$, $p < .05$). Demographic factors jointly predicted PWB ($R^2 = .24$, $F(3, 156) = 2.35$; $P < .05$). Further, average monthly income ($\beta = .302$, $p < 0.01$), and age ($\beta = .193$, $P < 0.001$) significantly independently predicted PWB, while marital status ($\beta = .085$, $P > 0.05$), and gender ($\beta = -.104$, $P > 0.05$) did not. There is a significant inverse relationship between age and average monthly income ($r = -.264$, $p < .05$), while a significant positive relationship was recorded between average monthly income and PWB ($r = .186$, $p < .01$). There was no significant relationship between age and PWB ($r = .026$, $p > .05$). This shows the importance of psychological and socio-demographic factors in psychological adjustment to amputation. Efforts

aimed at improving income, reducing depression, and stabilising the personality of amputees will be helpful in reducing the psychological stress associated with lower-limb amputation.

Key words: Psychological wellbeing, lower-limb amputees, Nigeria, psychological and demographic factors.

Introduction

Amputation, which means the severance of a limb or part of it is the most ancient of all surgical procedures carried out for punitive or therapeutic reasons (Olaolorun, 2001, Adejumo & Adejumo, 2005). Limb loss can be the result of trauma, malignancy, disease, or congenital anomaly (Amputee Coalition of America, 2010). In the United States, about 160,000 amputations are performed annually, 85 to 90% involve removal of a lower extremity (Williamson, 1995), with more than 664,000 persons living with major limb loss in the USA in 2005 (Ziegler-Graham, MacKenzie, Ephraim, Trivison, & Brookmeyer, 2008). A report from the United Kingdom indicates that there are over 100,000 amputees with an average of 5,000 new amputees referred annually to Limb Fitting Centres for the provision of artificial limbs (Bethany Hamilton – Surfing, 2009).

Although amputation is a common surgical procedure in Nigeria, there are no national data on the subject; but the estimated prevalence of extremity amputation in Nigeria is 1.6 per 100,000 (Thanni & Tade, 2007). Many studies in Nigeria have been focused on indications for amputation. Between 1987 and 1999 in Ilorin, trauma accounted for 60 (73.4%) of amputation cases with road traffic accident causing 73.4% of such traumas (Olasinde, Oginni, Bankole, Adegbehigbe, & Oluwadiya, 2002). Between January, 2007 and Dec. 2009 at the Lagos University Teaching Hospital, Lagos, diabetic foot gangrene accounted for 55.14% of amputations done (Enweluzo, Giwa, Adekoya-Cole, & Mofikoya, 2010). However, Obalum and Okeke (2009) found in a study done between 1997 and 2006 that trauma, especially from motorcycle accidents, in agreement of the

finding of Adejumo, (2010), was the most common indication, accounting for 61.8%.

To have a limb amputated is a major event. The psychological and emotional impact of the trauma of a limb loss can be devastating (Jenner, 2010). Most patients who lose a limb as a result of traumatic or surgical procedures encounter a series of complex psychological responses (Cansever, Uzun, Yildiz, Ates, & Atesalp, 2003), often characterised by phantom pain, feeling of despair and loss (Wardle & Steptoe, 2001). Many people to some extent adjust to amputation, but others often fail to cope emotionally, developing psychiatric symptoms in the process (Frieson & Lippmann, 1987). Frierson and Lippmann (1987) also observed that as many as 50% of all amputees require some sort of psychological intervention; with Atherton and Robertson (2006) stressing that depression is the most common psychological reaction among amputees. In a Nigerian sample, Mosaku, Akinyoola, Fatoye, and Adegbehingbe (2008) also reported that psychological symptoms are high with anxiety and depression being reported (64.3% and 59.5% respectively) post-operatively compared to other orthopaedic patients (14.3% and 12.0% respectively). This agrees with the outcome of a similar study in Jordan, where a 37% and 20% prevalence of anxiety and depressive symptoms was reported among amputees (Hawamdeh, Othman, and Ibrahim, 2008).

Although research amply indicates that limb amputation poses serious threats to psychological well-being (Williamson and Walters (2010), little is known about the role of personality. Martin, Grunendahl, and Martin, (2001) associated personality characteristics with health and longevity. They found that conscientiousness personality trait has positive influences on health and longevity. Further, they asserted that conscientious people may be more likely to cultivate good health habits and follow health advice. Personality has also been associated with susceptibility to many health challenges particularly among older women. The neuroticism trait has been observed to be the most consistent correlate of perceived susceptibility, while other personality traits (Extraversion, Agreeableness, conscientiousness and openness) were significant negative predictors

of general perceived susceptibility to issues that challenge psychological health (Gerend, Aiken & West, 2004). Another study conducted by Horgan and Maclachlan's (2004) similarly revealed that of factors associated with positive adjustment to limb loss, the role of an optimistic personality among others is critical.

The importance of socio-demographic factors in psychological adjustment to amputation has been documented in literature (Cansever, Uzun, Yildiz, et al. 2003; Hawamdeh, Othman, & Ibrahim, (2008). But the role of average monthly income, age, marital status, and gender is not well understood. Economic stability through regular income could be very critical in meeting social and health needs. An individual's capacity for productive life, and ability to meet personal and family's basic needs are fundamental in reducing alteration in family and social processes, as well as for maintaining physical and psychological health (Hawamdeh, Othman, & Ibrahim, 2008). Without the ability to meet basic needs in the area of paying hospital bills, transportation, and procuring fitting prosthesis, amputees often lose self-esteem and self-efficacy; the coping mechanism weakens with its attendant psychological stress.

Many studies revealed that the average age of amputees is in Nigeria falls between 30 and 36 years (Thanni, & Tade, 2007; Obalum & Okeke, 2009). Enweluzo, Giwa, Adekoya-Cole, and Mofikoya (2010), however reported a mean age of 43.0 +/- 19.4 years, with a male: female ratio of 1.7 to 1. Variables predicting more negative impact on psychological health include old age and being unmarried (Williamson, Andrew, & Walters, 2010; & Fisher & Hanspal, 1998); while Lynch, Antonak, and Gerhardt (1999) observed that young adults with traumatic amputation may be at higher risk of major depression compared with individuals with disease-related amputations.

The purpose of this study was therefore to determine the role of psychological and demographic factors in the psychological wellbeing of amputees, using the following research questions as guide:

Research questions:

- (i) What is the relationship between personality factors, depression, and psychological wellbeing among lower limb amputees?
- (ii) Do personality factors independently predict Psychological wellbeing among lower limb amputees?
- (iii) Do demographic factors (average monthly income, age, marital status, and gender) independently predict psychological wellbeing of lower limb amputees?
- (iii) Do personality factors jointly predict Psychological wellbeing among lower limb amputees?
- (iv) Do demographic factors (average monthly income, age, marital status, and gender) jointly predict psychological wellbeing of lower limb amputees?
- (v) Is there any relationship between average monthly income, age, and psychological wellbeing of lower limb amputees?
- (vi) Do personality and demographic factors independently predict psychological well-being of lower limb amputees?

Materials and Method

Design: This study utilized a cross-sectional survey research design. The independent variables are psychological factors (depression and personality traits), and demographic factors (age, sex, marital status, and average monthly income). The dependent variable is psychological well-being.

Setting and population: The study which took place at the National Orthopedic Hospital, Igbobi, Lagos (NOHIL) and the University College Hospital (UCH), Ibadan included post-operative lower limb amputees. The inclusion criteria included previous lower-limb amputation (involving the right or left or both limbs) in either of the two hospitals, currently on follow up treatment, literate in Yoruba or English languages, and willingness to participate.

Participants: The study sample which included 112 purposively selected lower limb amputees were made up of 96 (85.7%) males and 16 (14.3%) females whose age ranged between 18 and 62 years with a

mean of a mean age of 36.25 +/- 11.45 years. About 47 (54%) were single, 33 (29.4.9%) were married and the remaining 32 (28.6%) were separated. There were 69 (61.6%) below-knee amputees, 43 (38.4%) above-knee amputees. Forty-six (52.9%) of these had amputation as a result of trauma, while 41 (47.1%) had amputation due to various diseases.

Ethical Approval: Considering that the study included a vulnerable population, extra efforts were made to insist on due ethical processes and protection of the participants. A protocol for the study was submitted through the Department of Psychology, University of Ibadan, to the University of Ibadan/University College Hospital Ethical Review Committee. Following full ethical considerations, the study was certified scientifically and ethically valid; permission was therefore granted to conduct the study. The office of the Chairman Medical Advisory Committee (CMAC) of the UCH, Ibadan, and the authorities of the NOHIL, Igbobi, Lagos also granted ethical permission to conduct the study.

Instruments: A 54-item self-report questionnaire was used for data collection. It was divided into 5 sections. The 9-item Section A tapped information about participants' demographic characteristics including gender, age, marital status, average monthly income, indication for amputation, etc.

Section B with 10 items assessed personality traits (Extroversion, Neuroticism, Agreeableness, Openness to experience and Conscientiousness) of the participants using the 10-item short version of the Big Five Inventory (BFI) developed by Rammstedt & Oliver, (2007). The BFI has a 5-point Likert response format ranging from "Strongly Agree" to "Strongly Disagree". A Cronbach alpha coefficient of .86 was reported. In the present study, an item-total correlation coefficient ranging between .40 and .60 were obtained across the various sub-scales of the instrument with a norm of $\bar{X} = 25 \pm 5.31$.

Section C included the 21-item Beck's Depression Inventory developed by Beck (1987). Beck (1987) reported a split-half reliability

from .78 to .93, and a coefficient alpha of .92 for outpatients and .93 for college students (Beck, Steer & Brown, 1994). During the revalidation, three of the items were dropped for yielding correlations below .35. A Spearman Brown reliability of .88 and Cronbach alpha of .92 were obtained during this study.

The 12-item Section D included the Ryff's psychological wellbeing scale (Ryff, 1989). It has a Likert-response format with scores ranging from Strongly Disagree to Strongly Agree. A high score indicates a higher/better psychological well-being, vice versa. The author reported an internal reliability coefficient (alphas) ranging from .77 to .86. For this study, a split-half reliability of .75 and .41 were observed for parts 1 and 2 respectively, with a Cronbach alpha of .93. A norm of $\bar{X}=52.85$ and $SD=15.8$ was established.

Procedure: Following ethical approval, a copy of the approval letter and the protocol were presented to the CMAC in UCH, and the NOHIL from where permission was granted to discuss with the Consultant Orthopaedic Surgeons in the hospitals. This yielded further collaboration and facilitation through which potential participants in the Orthopaedic Clinics in the two hospitals were contacted. Prospective participants were contacted individually as they waited to see their surgeons/physicians for post-operative consultation. The purpose of the study was explained, followed by informed consent processes. Willing participants were communicated with according to their preference for Yoruba (being the predominant language in the research settings) or English language; the research instrument was also presented in the two languages. A copy of the questionnaire was given to each consenting participant, as the participant waited for their turn to be seen by their respective surgeons. This took an average of 25 minutes. The questionnaires were collected immediately after completion. A total of 175 questionnaires were administered in the two settings, however only 112 were returned and fully completed, representing 64% response rate. Completed questionnaires were coded and entered into a computer and analysed with version 11.0 of the SPSS software.

Results

In order to provide answers to the research questions, a combination of both descriptive and inferential statistics were conducted. The results are presented in the Tables below.

To determine the relationship between depression, personality, and psychological wellbeing among amputees, a Pearson correlation analysis was conducted. The result is presented in Table 1 below:

Table 1: Showing the summary of Pearson correlation of psychological factors (depression, personality) and Psychological wellbeing

	O	C	E	A	N	Dep	PsyWB
O	1						
C	-.156	1					
E	-.100	-.051	1				
A	-.051	.046	0.92	1			
N	.153	-.135	.003	.006	1		
Dep	-.107	-.359**		.123	.179	1	
PSYWB	-.295**	-.249**	.018		.056	.150	1
		.028	.278**				

** correlation is significant at 0.01 level (2-tailed).

Key: Dep=Depression, PsyWB=Psychological wellbeing, O=Openness to experience, C=Conscientiousness, E=Extraversion, A=Agreeableness, and N=Neuroticism.

The Table above shows that there is a significant inverse relationship between psychological wellbeing and openness to experience ($r = -.295, p < .05$), conscientiousness ($r = .249, p < .05$), and agreeableness ($r = -.278, p < .05$). A significant inverse relationship was also observed between depression and conscientiousness ($r = -.359, p < .05$).

In order to test whether personality factors predict psychological wellbeing among lower limb amputees, a multiple regression analysis was conducted with the Table presented as follows:

Table 2 Summary of Multiple Regression analysis Table showing personality characteristics as predictors of psychological wellbeing

Predictor variables	Beta	SEB	R ²	R ² Cum	T	P	F	P
Openness	.297	.292	.08	.08	3.339	<0.5		
Conscientiousness	.180	.207	.04	.12	2.041	<0.5		
Extraversion	-.037	.038	.01	.13	.428	NS	111	<.05
Agreeableness	.289	.288	.08	.21	3.336	<0.5		
Neuroticism	0.79	.080	.06	.27	.890	<0.5		

Table 2 shows that personality characteristics jointly predicted psychological wellbeing ($F(5,106) = 111, p < 0.05$), contributing 27% to the variance in psychological wellbeing. All the personality characteristics (openness to experience [$\beta = -.297, p < 0.01$]), conscientiousness [$\beta = .180, P < 0.001$]), agreeableness [$\beta = .289, P < 0.05$]), and neuroticism [$\beta = 0.79, p < 0.01$]) except extraversion ($\beta = -.037, P > 0.05$) also independently predicted psychological wellbeing.

To test whether demographic factors (average monthly income, age, marital status, and gender) independently and jointly predict psychological wellbeing of lower limb amputees, a multiple regression analysis was conducted with the results presented in Table 3 below.

Table 3: Summary of Multiple Regression analysis Table showing demographic factors as predictors of psychological wellbeing

Predictor variables	Beta	SEB	R ²	R ² Cum	T	P	F	P
Average Income	.302	.381	.12	.12	2.412	<.05		
Age	.193	.201	.08	.20	1.057	<.05		<.05
Marital Status	.085	.103	.03	.23	.602	>.05	2.35	
Gender	-.104	.315	.01	.24	1.094	>.05		

Table 3 shows that demographic factors jointly predicted psychological wellbeing ($R^2 = .24, F(3, 156) = 2.35; P < .05$), contributing 24% to the variance in psychological wellbeing. Further, average monthly income

($\beta = .302$, $p < 0.01$), and age ($\beta = .193$, $P < 0.001$) independently predicted psychological wellbeing. Marital status ($\beta = .085$, $P > 0.05$), and gender ($\beta = -.104$, $P > 0.05$) did not independently predict psychological wellbeing.

In order to determine whether any significant relationship exist between average monthly income, age, and psychological wellbeing of lower limb amputees, a correlation statistic was conducted with the results presented in Table 4 below.

Table 4: Summary of correlation analysis showing the relationship between average monthly income, age and psychological wellbeing

Variables	Income	Age	PSYWB
Income	--		
Age	-.264**	--	
PSYWB	.186*	.026	--

** $P < 0.01$, * $P < 0.05$

Table 4 shows that there is a significant inverse relationship between age of amputee and average monthly income ($r = -.264$, $p < .05$). There is a significant positive relationship between average monthly income and psychological wellbeing ($r = .186$, $p < .01$). There was no significant relationship between age and psychological wellbeing ($r = .026$, $p > .05$).

To test whether there are differences in levels of age, gender, average monthly income, and marital status in lower limb amputees' psychological wellbeing, t-tests were conducted with the results presented below:

Table 5: Summary of independent t-tests showing means and standard deviation of age, gender, marital status, and monthly income on psychological wellbeing among below knee amputees

Variables	Levels	N	\bar{X}	SD	DF	T	P
Age	Young	59	53.2	15.19	110	.258	<.05
	Old	53	52.5	15.2			
Gender	Male	96	52.92	15.01	110	-.005	NS
	Female	16	52.93	16.55			
Marital status	Married	80	52.86	14.68	110	-.234	<.05
	Single	32	53.64	16.25			
Monthly income	Low	50	52.30	.46	110	-1.99	<.05
	High	62	54.10	.50			

The result in Table 5 reveals that there is a significant difference in the mean of young and old respondents on psychological wellbeing ($t=.258$, $df=110$, $p<0.05$). Younger respondents reported higher level of psychological wellbeing ($\bar{X}=53$, $SD= 15.19$) than older respondents ($\bar{X}=52.5$, $SD= 15.2$). There was no significant gender difference in the mean score of male and female respondents on psychological wellbeing ($t= -.005$, $df=110$, $p>0.05$). Marital status yielded a significant difference on psychological wellbeing among lower limb amputees, ($t=-.234$, $df= 106$, $p<.05$). Single amputees reported higher means on psychological wellbeing ($\bar{X}=53.64$, $SD= 16.25$) compared to married respondents ($\bar{X}=52.86$, $SD=14.68$). Participants' level of average monthly income yielded significant influence psychological wellbeing ($t= -1.99$, $df= 110$, $p<.05$) with participants earning higher monthly income reporting higher level of psychological wellbeing ($\bar{X}=54.10$, $SD= 0.50$) than those with lower monthly income ($\bar{X}= 52.30$, $SD=0.46$, $p<.05$).

Discussion

This study investigated the role of psychological and demographic factors on the psychological wellbeing of lower-limb amputees. It could be seen that there is a significant inverse relationship between psychological wellbeing and personality characteristics of openness to experience, conscientiousness, and agreeableness. A significant inverse relationship was also observed between depression and conscientiousness. This implies that the higher a participants' level of psychological wellbeing, the lower the individual's level of openness to experience, conscientiousness, and agreeableness. It also means that the higher the level of conscientiousness in an individual, the lower the individual's tendency to manifest depression. This finding is in agreement with the outcome of a similar study conducted by Martin, Grunendahl, and Martin, (2001) which upheld the relevance of conscientiousness in predicting health-related issues. The difference however lies in the fact that the dependent variable in Martin, Grunendahl, and Martin's study was health and longevity and not psychological wellbeing of amputees as seen in the present study.

The inverse relationship between psychological wellbeing and some personality traits, especially among amputees in a resource-limited society

like Nigeria is likely informed by poor social and welfare support schemes for amputees and victims of emergencies. These challenges are potential sources of psychological stress, especially among amputees as earlier reported by Williamson and Walters (2010). To further illustrate this, a conscientious person is expected not only to be painstaking and show great attention in carrying out a task or role; people with such traits are also strongly governed by a sense of right or wrong. Therefore, it is possible that amputees with high scores in conscientiousness may perceive their condition as too intense physical and psychological assault. Such individuals would likely feel that it is very wrong and unacceptable to suffer limb loss, no matter the cause. Therefore, the higher such individuals score in conscientiousness, the lower the probable score in psychological wellbeing assessment.

Although the above may appear plausible for a psychological explanation for the inverse relationship between conscientiousness and psychological wellbeing, the same explanation may not be persuasive for agreeableness and openness personality characteristics. This is also true considering that an inverse relationship was observed between depression and conscientiousness in this study, just as Gerend, Aiken, and West, (2004) also discovered that certain personality traits (extraversion, agreeableness, conscientiousness and openness) were significant negative predictors of perceived susceptibility to issues that challenge psychological health.

In another dimension, personality characteristics jointly predicted psychological wellbeing, contributing 27% to the variance in psychological wellbeing. All the personality characteristics except extraversion also significantly independently predicted psychological wellbeing. This means that the personality traits in one way or the other influenced the variations reported in psychological wellbeing among amputees in this study, while extraversion did not.

Demographic factors jointly predicted psychological wellbeing, contributing 24% to the variance in psychological wellbeing. This means that age, gender, average monthly income, and marital status jointly influenced changes in psychological wellbeing. This is an improvement over the study conducted by Hawamdeh, Othman, and Ibrahim, (2008) because this study focused on the impact of specific demographic variables on psychological wellbeing of amputees. It implies that when considering

factors that could predict psychological wellbeing among amputees, the demographic factors should be considered as variables that could jointly influence their psychological wellbeing. More precisely, average monthly income, and age had significantly independent influence on psychological wellbeing. This means that these factors could be considered as factors that could singularly predict whether an amputee would have psychological wellbeing or not. This supports the finding of Williamson, Andrew, and Walters, (2010) where age and marital status were discovered to be associated with psychological health.

A closer observation would reveal that average monthly income yielded 12% of the entire variation in psychological wellbeing, while age yielded 8% as observed in Table 3. Further, a significant positive relationship was established between average monthly income and psychological wellbeing as reported in Table 4. A significant difference was also observed in the means of participants with high average monthly income ($\bar{x}=54.10$, $SD=0.50$) and those with low monthly income ($\bar{x}=52.30$, $SD=0.46$), just as age significantly predicted psychological wellbeing in Table 3, while a significant difference in the mean score on psychological wellbeing was observed between old and young amputees as presented in Table 5. This implies that if the average monthly income of an amputee is sufficiently high, it may cushion the physical or psychological impact of the trauma of amputation, substantially contributing to the amputees' psychological health in the process. In the same vein, a significant difference existed between old and young participants in their mean score on psychological wellbeing. It suggests that if an amputee is fairly younger, the young age is a possible factor to boost the amputee's psychological health due to a possible reduction in the negative impact of the ageing process, which may reduce bio-psychosocial adjustment to the stress of amputation.

Limitations

Some of the limitations of the current study include the small sample size, the descriptive nature of the study; therefore the subjects were not followed longitudinally. Further, many surgical amputees have associated illnesses such as diabetes mellitus which may contribute to

their symptoms. Future studies can explore the role of other variables such as phantom pain, type and fitting of prosthesis on quality of life and psychological wellbeing of amputees.

Conclusion

This study confirms that personality characteristics jointly predicted psychological wellbeing. A significant inverse relationship was observed between psychological wellbeing and openness to experience, conscientiousness, and agreeableness. A significant inverse relationship was also observed between depression and conscientiousness. Demographic factors jointly predicted psychological wellbeing. Further, average monthly income, and age significantly independently predicted psychological wellbeing, while marital status did not.

The data also showed the importance of psychological and socio-demographic factors in psychological adjustment to amputation. Thus, we recommend appropriate psychological assessment, intervention, and rehabilitation for all individuals with lower limb amputation, and especially for those with a high propensity for psychological stress. These should involve multi-disciplinary group including health psychologists; with activities evidence based and covering the entire perioperative period of an amputee's surgical experience.

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