Modelling the Probability of Functional Health Literacy Based on Traditional Media Consumption Patterns in High-Illiteracy Provinces in South Africa

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Article

Modelling the Probability of Functional Health Literacy Based on Traditional Media Consumption Patterns in High-Illiteracy Provinces in South Africa

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Abstract

Background and Objectives: Formal education in Africa is becoming increasingly influenced by the traditional media consumption, ranging from television and radio to internet usage. This study aims to determine the effects of traditional media consumption on health literacy in provinces with high illiteracy. *Materials and Method*: The study adopted a retrospective cross-sectional study design using the 2016 South African Demographic Survey Data to analyse the factors affecting health literacy. Participants were selected using a stratified two-stage sampling method to ensure national and provincial representativeness. A total of 1 982 participants aged 15 – 29 years who met the inclusion criteria were included for further analysis. Pearson's Chi-square test was used to test for association between health literacy and media consumption. Multivariate logistic regression was used to determine the effects of traditional media consumption on health literacy, $p \leq 0.05$ was considered statistically significant. STATA version 16.1 (StataCorp, LLC, College Station TX, USA) was used for analysis. *Results*: The results showed that media consumption emerged as a strong predictor, individuals who reported watching television had increased odds of health literacy (OR = 2.67; 95% CI: 1.55 - 4.61; $p < 0.001$). Similarly, internet use was positive predictor of health literacy (OR = 3.11; 95% CI: 1.76 - 5.52; $p < 0.001$. Other variables such as educational level also emerged as a significant predictor, individuals with secondary school education had significantly higher odds of health literacy compared to those with lower educational levels (OR = 17.10; 95% CI: 4.20 - 69.63; $p < 0.001$). *Conclusion*: This study highlights the critical role media consumption plays in shaping health literacy outcomes among the youth, particularly in provinces with high illiteracy rates. By using media platforms strategically and ensuring equitable access, educators, health practitioners and policymakers can unlock new pathways to health literacy, fostering a more informed, empowered, and connected society.

Keywords: health literacy; internet usage; traditional media consumption; South Africa

1. Introduction

Traditional conceptions of education were once centered on printed texts, since early 2001 formal education has becoming increasingly influenced both positively and negatively by the rise of traditional media consumption, such as television, radio, and internet usage [1,2]. In the context of low- and middle-income countries the rise in the use of traditional media consumption presents among others, demographic divide. According to Sitto and Lubinga [3] and Conroy-Krutz et al. [4] radio remain the mostly widely accessed source of traditional media consumption across all demography. However, Conroy-Krutz et al. posit that newspaper, television and internet usage remains inaccessible for most people residing in rural areas and those in the lower wealth index [4]. Several other studies also highlight the persistent demographic divide due to media consumption [3,5]. This demographic inequality if unattended could present severe implications for one of the

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fundamental components of the United Nations' sustainable development 2030 agenda being inclusive and equitable quality education for all.

This study focuses on three traditional media consumption, i.e., radio, television, and internet use to measure their incremental effect on health literacy in provinces with high illiteracy. These three media consumptions were selected due to their commonality in the South African and African setting [6–8]. Despite the high global usage of internet, it remains low in the African region [6,8]. Eastern Cape, KwaZulu Nata, Mpumalanga, and North West, like the broader South Africa, faces a significant health burden, characterized by high prevalence rates of mental disorders, human immune virus and inequalities in service accessibility [9–13]. A major health crisis facing the South African health system is the treatment gap, with reports indicating that nearly 75% of people with health issues in South Africa do not have access to any form of healthcare [10,12]. This is due to a shortage of healthcare professionals, limited resources, and uneven distribution of services as a consequence of department of health budget cuts and mismanagement of funds [12,14]. Health literacy becomes a critical aspect to addressing the persistent health divide and service inequalities, particularly in provinces with high illiteracy.

Several studies show that traditional media consumption and health literacy are positively correlated, particularly that participants who have higher education level have increased levels of health literacy compared to those with primary and no formal education [15,16]. Additionally, other factors such as age, gender, and financial stability, among others, were also significant correlates of health literacy [17–20]. de Oliveira Collet et al. on the other hand reports that participants with higher health literacy levels often conduct research on their health status and seek for healthcare providers through digital platforms [21]. Ye further report that participants health literacy is increased by their frequent usage of digital media for health-related resources [22]. Cramer et al. showed that most participants reported having stable internet connection at their residences, however, their frequency of obtaining health related resources was minimal, with less than 3% reporting that they made doctor's appointment through the internet [23].

Most of the studies on traditional and digital media consumption are concentrated on the covid-19 effects [24–27]], while others where focused on digital literacy of learners in schools [28,29], and university students [26,27]. However, fewer studies have focused particularly on the effects of traditional media platforms pre-covid-19, specifically in constrained and remote areas where digital media is infrequent and traditional media proliferates. Research has demonstrated that traditional media carries great potential to raise awareness and orientate residents in remote areas concerning current affairs and breaking news [6–8]. However, in low- and middle-income countries, including South Africa, studies of this nature are less concentrated. To our knowledge, this is the first study which seeks to assess the effects of traditional media consumption on health literacy in provinces with reported high illiteracy in South Africa utilizing the pre-covid-19 South African Demographic Health Survey (2016 SADHS) data.

2. Materials and Methods

The study adopted a retrospective cross-sectional study design using data from the 2016 South African Demographic and Health Survey. Data were collected between June 27 and November 4, 2016, through structured questionnaires administered to a representative sample of individuals across various provinces in South Africa. The SADHS 2016 included all men aged 15 – 59 and women 15 – 49, who were residing in one of the nine provinces 24 hours prior to the survey. The Statistics South Africa and South African Medical Research Council sampled a total of 12 132 individuals, of which 8,514 women (age 15-49) and 3,618 men (age 15-59). The survey used the 2011 South African population census as the master sampling frame and employed a stratified two-stage random sampling technique. In the first stage, enumeration areas (EAs) were stratified by province and urban or non-urban status. In the second stage, households were randomly selected from each EA. To effectively use this rigorously determined sample size and ensure continuity and statistical power, this study integrated and analyzed all respondents from the original dataset who had complete in-

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formation on health literacy and were between 15 to 29 years of age and residing in provinces with high illiteracy (Eastern Cape, Limpopo, Mpumalanga, and North West). Data were gathered on various demographic, socioeconomic, educational and frequency of media consumption variables.

The variables included age, gender, marital status, education level, employment status, wealth index, type of residence, and province of residence. Additionally, information on participants' traditional media exposure (that is, listening to radio, watching television, and using the internet) were collected from June to November 2016, using two questionnaires for males and females, the questionnaires are available online (https://dhsprogram.com/pubs/pdf/FR337/FR337.pdf) [30]. The South African Demographic and Health Survey (SADHS) employed standardized DHS instruments, recognized globally for their methodological rigor and established face validity. Data collection was conducted by extensively trained field workers, with each team supervised by a senior professional nurse to ensure procedural trustworthiness. The instruments were uniformly administered across all provinces, enhancing both the reliability, validity, and cross-regional comparability of the data. Data were extracted from the .DTA files and exported to Microsoft Excel using STATA version 16.1 (StataCorp, Texas, USA) for further editing and recoding. The Excel spreadsheet was then exported to STATA for further analysis.

Continuous data were tested for normality and data represented as mean and standard deviation. Categorical data were represented using frequencies and percentages. To test for association between health literacy and socioeconomic and demographic factors, and traditional media exposure, Chi-square tests were employed, variables with a p-value less than 0.05 were assumed to be statistically significant. Univariate analysis was conducted to identify significant determinants affecting reading literacy for both genders. Variables with a p-value less than 0.25 were considered for inclusion in the multivariate model [31]. In the multivariate model, variables having a p-value less than 0.05 were statistically significant. The univariate and multivariate models were also used to determine the odds ratios for factors affecting reading literacy, while adjusting for potential confounders. All identifiers which could assist in identifying study participants were de-linked from the dataset, participants were informed of the purpose of the survey and that they can withdraw at any stage without any reason. The survey protocol (SADHS 2016) was reviewed and approved by the SAMRC Ethics Committee and the ICF Institutional Review Board [30].

3. Results

The study included 1 982 participants with a mean age of 21.60±4.33 years (range: 15 – 29). Of these, 1035 (52.22%) were females, and 743 (37.49) belonged to the age group 15 – 19 years. Most of the participants 576 (54.69%) were found in the KwaZulu-Natal province, furthermore, 1322 (66.70%) of the participants resided in rural areas across the four provinces. Over 80% of the study participants attained secondary education, while 1730 (87.29) of them were single. Additionally, most of the participants 1510 (76.19%) were unemployed, and 966 (48.74%) were classified as low class in the wealth index. Regarding media consumption and internet usage, 1366 (68.92%) listened to radio, 1614 (81.43%) watched television, and 1118 (56.41%) used internet, respectively. Table 1 summarizes participants demographic profiles.

Table 1. Participants demographic characteristics.

Variables	n (%)
Gender	
Female	1035 (52.22)
Male	947 (47.78)
Age	
15 – 19	743 (37.49)
20 – 24	640 (32.29)
25 – 29	599 (30.22)
Province	
Eastern Cape	508 (25.63)

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KwaZulu-Natal	576 (54.69)
Mpumalanga	518 (26.14)
North-West	380 (19.17)
Residence	
Rural	1322 (66.70)
Urban	660 (33.30)
Level of education	
No education	11 (0.55)
Primary	218 (11)
Secondary	1620 (81.74)
Higher	133 (6.71)
Marital Status	
Single	1730 (87.29)
Cohabiting	130 (6.66)
Married	118 (5.95)
Divorced	2 (0.1)
Widow	2 (0.1)
Employment	
Unemployed	1510 (76.19)
Employed	472 (23.81)
Wealth index	
Lower class	966 (48.74)
Middle class	479 (24.17)
Upper class	537 (27.09)
Media consumption	
Listen to radio	
Yes	1366 (68.92)
No	616 (31.08)
Watch television	
Yes	1614 (81.43)
No	368 (18.57)
Use internet	
Yes	1118 (56.41)
No	864 (43.59)

Participants health literacy illiteracy was significantly associated with being male, situated in the Limpopo province, and residing in rural areas. Additionally, having no formal education, and being a widow were also associated with high illiteracy levels, worth noting was that employment status, particularly being employed was associated with high illiteracy in these four provinces. Regarding media consumption, participants who were not exposed to any form of media consumption and internet usage had high illiteracy levels. Table 2 summarize the results on association between health literacy and key sociodemographic and behavioural correlates, including gender, age, province, residential setting, educational attainment, and media consumption habits, among others.

Table 2. Association between health literacy and key sociodemographic and behavioural correlates.

Variables	Literacy		p-value
	Yes	No	
Gender			
Female	1008 (97.39%)	27 (2.61%)	0.003
Male	877 (92.16%)	70 (7.39%)	< 0.001
Age			
15 – 19	712 (95.83%)	31 (4.17%)	0.249
20 – 24	601 (93.91%)	39 (6.09%)	0.087
25 – 29	572 (95.49%)	27 (4.51%)	0.600
Province			
Eastern Cape	488 (98.06%)	20 (3.94%)	0.246

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Limpopo	535 (92.88%)	41 (7.12%)	0.003
Mpumalanga	505 (97.49%)	13 (2.51%)	0.003
North-West	357 (93.95%)	23 (6.05%)	0.244
Residence			
Rural	1248 (94.40%)	74 (5.60%)	0.040
Urban	637 (96.52%)	23 (3.48%)	0.040
Level of education			
No education	6 (54.55%)	5 (45.45)	< 0.001
Primary	178 (81.65%)	40 (18.35%)	< 0.001
Secondary	1568 (96.79%)	52 (3.21%)	< 0.001
Higher	133 (100%)	0 (0%)	0.007
Marital Status			
Single	1651 (95.43%)	79 (4.57%)	0.077
Cohabiting	123 (94.62%)	7 (5.38%)	0.789
Married	108 (91.53%)	10 (8.47%)	0.063
Divorced	2 (100%)	0 (0%)	0.748
Widow	1 (50%)	1 (50%)	0.003
Employment			
Unemployed	1446 (95.76%)	64 (4.24%)	0.016
Employed	439 (93.01%)	33 (6.99%)	0.016
Wealth index			
Lower class	913 (94.51%)	53 (5.49%)	0.233
Middle class	455 (94.99%)	24 (5.01%)	0.892
Upper class	517 (96.28%)	20 (3.72%)	0.141
Media consumption			
Listen to radio			
Yes	1308 (95.75%)	58 (4.25%)	0.046
No	577 (93.67%)	39 (6.33%)	0.046
Watch television			
Yes	1554 (96.28%)	60 (3.72%)	< 0.001
No	331 (89.95%)	37 (10.05%)	< 0.001
Use internet			
Yes	1098 (98.21%)	20 (1.79%)	< 0.001
No	787 (91.09%)	77 (8.91%)	< 0.001

To determine the determinants of health literacy, both bivariate and multivariate logistic regression analyses were conducted. The multivariate model incorporated key sociodemographic and behavioral variables, including gender, age, province, residential setting, educational attainment, and media consumption habits, among others. Of these, educational attainment emerged as a strong predictor, individuals with secondary school education had significantly higher odds of higher health literacy compared to those with lower educational levels (OR = 17.10; 95% CI: 4.20 - 69.63; $p < 0.001$). Media consumption also showed notable health literacy levels. Participants who reported watching television had increased odds of health literacy (OR = 2.67; 95% CI: 1.55 - 4.61; $p < 0.001$), suggesting that televised health content may play a meaningful role in disseminating public health information. Similarly, internet use was positively associated with health literacy (OR = 3.11; 95% CI: 1.76 - 5.52; $p < 0.001$), indicating that digital platforms may serve as effective channels for health education and awareness. Table 3 summarizes the univariate and bivariate analysis of factors influencing participants' health literacy.

Table 3. Univariate and Bivariate analysis of factors influencing health literacy.

Variables	Bivariate model		Multivariate model	
	OR (95%CI)	p-value	OR (95%CI)	p-value
Gender				
Female	1	1	1	1
Male	0.34 (0.21, 0.53)	< 0.001	0.31 (0.18, 0.54)	< 0.001
Age				

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15 – 19	1	1	1	1
20 – 24	0.67 (0.41, 1.09)	0.106	0.56 (0.32, 1.00)	0.051
25 – 29	0.92 (0.54, 1.56)	0.764	0.84 (0.43, 1.63)	0.598
Province				
North-West	1	1	1	1
Eastern Cape	1.57 (0.85, 2.91)	0.149	2.1 (1.03, 4.29)	0.041
Mpumalanga	0.84 (0.50, 1.43)	0.519	0.54 (0.29, 1.01)	0.055
Limpopo	2.50 (1.25, 5.01)	0.010	1.69 (0.79, 3.62)	0.173
Residence				
Rural	1	1	1	1
Urban	1.64 (1.02, 2.65)	0.042	1.08 (0.62, 1.88)	0.792
Level of education				
No education	1	1	1	1
Primary	3.71 (1.08, 12.76)	0.038	3.65 (0.89, 15.07)	0.073
Secondary	25.13 (7.43, 84.99)	< 0.001	17.10 (4.20, 69.63)	< 0.001
Marital Status				
Married	1	1	1	1
Cohabiting	1.63 (0.60, 4.42)	0.340	1.21 (0.38, 3.84)	0.744
Single	1.94 (0.97, 3.84)	0.059	1.77 (0.76, 4.08)	0.187
Widow	0.09 (0.005, 1.60)	0.101	0.09 (0.004, 1.99)	0.129
Employment				
Unemployed	1	1	1	1
Employed	0.59 (0.38, 0.91)	0.017	0.69 (0.40, 1.20)	0.189
Wealth index				
Lower class	1	1	1	1
Middle class	1.10 (0.67, 1.81)	0.705	0.74 (0.41, 1.34)	0.320
Upper class	1.50 (0.89, 2.54)	0.130	0.74 (0.39, 1.42)	0.366
Media consumption				
Listen to radio				
No	1	1	1	1
Yes	1.52 (1.00, 2.31)	0.048	1.07 (0.65, 1.77)	0.780
Watch television				
No	1	1	1	1
Yes	2.90 (1.89, 4.44)	< 0.001	2.67 (1.55, 4.61)	< 0.001
Use internet				
No	1	1	1	1
Yes	5.37 (3.26, 8.86)	< 0.001	3.11 (1.76, 5.52)	< 0.001

4. Discussion

This study aimed to investigate the determinants of health literacy among the participants aged 15 to 29 years old in South Africa using the 2016 SADHS. The logistic regression analysis revealed that covariates such as gender, educational level, watching television and internet usage were significant predictor of higher health literacy. Females consistently outperformed their male counterparts in health literacy, a finding consistent with several other studies [32–34]. In consistently, Heizomi et al. showed that Iranian males were better at reading skills, accessing, and using health information compared to females [35]. Similarly, Shabi and Oyewusi also showed that males in Nigeria had higher health literacy compared to their female counterpart [36]. These gendered differences might be influenced by societal norms, communication styles, and cultural factors that shape how individuals' approach and engage with health-related information.

Individuals with secondary school education were significantly more likely to exhibit higher health literacy (OR = 17.10; 95% CI: 4.20 - 69.63; $p < 0.001$) compared to other groups. Several studies also report the significant effect of level of education on health literacy, particularly that participants who have higher education level had increased levels of health literacy compared to those with primary and no formal education [15,16]. The reason for the strong effect could be due to the fact that formal education has potential to equip individuals with the cognitive and functional skills necessary

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to access, comprehend, and apply health information effectively [37–40]. Moreover, several other studies have also reported that health literacy depends upon several other factors apart from educational attainment, this includes age, gender, and financial stability, among others [17–20]. Suggesting that educational attainment is not a superior factor to achieve equitable health literacy, all factors should be considered. Thus, it is important for practitioners and policy makers to consider context and specific needs of the people and communities when crafting interventions and campaign programs.

The study further reported the effect of watching television (OR = 2.67; 95% CI: 1.55 - 4.61; $p < 0.001$) on health literacy, indicating that televised content may serve as an effective medium for disseminating health information and improving individual's health literacy. This finding was consistent with several other studies [41,42]. The reason for the significant effect could be that health-related programs whether through public service announcements, documentaries, or entertainment formats contribute meaningfully to public understanding of health-related issues [41,43,44].

Additionally given television's broad reach across diverse demographic groups in South Africa, it presents a valuable platform for large-scale health promotion campaigns and awareness, particularly in provinces with high illiteracy and places with poor health services delivery. Although the present study found a statistically significant effect between television viewing and literacy, other studies have shown no link between television and viewing and literacy, particularly that television viewing destructs individuals from other important educational activities [45–48]. Milshtein and Henik argue that reading is an act for manipulating cognitive process and allows for a deeper narrative comprehension, though no relation between television and reading was considered [49].

The logistic regression analysis further revealed that internet use was a significant predictor of participants health literacy. Particularly, individuals who reported using the internet had three-fold odds of higher health literacy compared to those who did not (OR = 3.11, 95% CI: 1.76 - 5.52, $p < 0.001$). Consistent with the current finding, de Oliveira Collect et al., reported that participants with higher health literacy levels often conduct research on their health status and seek for healthcare providers through internet platforms [22]. Ye further report that participants health literacy is increased by their frequent usage of the internet for health-related resources. Inconsistently, Cramer et al. showed diverging finding, that is, most participants reported having stable internet connection at their residences, however, their frequency of obtaining health related resources was minimal, with less than 3% reporting that they made doctor's appointment through the internet [23].

This could suggest that while internet access is available, it is directed to other activities other than sourcing of health-related information. Furthermore, Shi et al. also reported the low levels of health literacy and further highlighting that the low usage of internet and social media platforms may have been a contributing factor [50]. Zhao et al. similarly showed the effects of internet usage in increasing participants health literacy levels, particularly, participants who used internet frequently for health-related information had increased levels of health literacy [51]. The reason for the study finding could be that digital access play a crucial role in empowering individuals with health-related knowledge [52,53].

4.1. Implications for Theory and Practice

The findings of this study have important implications for theory and practice. Firstly, while television viewing can positively influence health literacy, its impact depends on content; therefore, parental supervision in selecting appropriate programs for adolescents and young adults is essential. Secondly, evidence from Ware et al. (2024) indicates that initiatives such as LifeLab-Soweto can enhance health literacy among youth [54]. Extending similar programs to high-illiteracy provinces through collaboration between health, education, and private sectors could yield significant benefits. Thirdly, Okanmelu et al. (2025) demonstrated that multi-media education-entertainment (MM-EE) interventions improve food and nutrition literacy among community health workers (CHWs) [55]. Given their critical role in disseminating health information, adapting MM-EE for CHWs in rural and township areas could strengthen community-level health education. Finally, educational

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practitioners should consider integrating content from LifeLab-Soweto and MM-EE interventions into subjects such as Life Orientation to raise awareness and promote health literacy among adolescents and young adults.

5. Conclusions

The present study underpinned the incremental effect of traditional media consumption, particularly, that television viewing, radio listening and internet usage has significant effect in shaping the health literacy outcomes of adolescents and young adults in provinces with high illiteracy in South Africa. Educational attainment, particularly completion of secondary schooling, demonstrated the greatest effect on health literacy, reaffirming the critical interplay between formal education and access to health-related information. The results suggest that traditional media platforms, when strategically leveraged, can serve as effective conduits for dissemination of health education, especially in resource-constrained settings where health services remain infrequent. Moreover, television's broad reach and the growing penetration of internet services present unique opportunities for targeted health campaigns aimed at adolescents and young adults in provinces with high illiteracy. However, disparities in access driven by geography, socioeconomic status, and gender divide, highlight the need for context-sensitive interventions that integrate media-based strategies with educational and community-level interventions. By bridging the gap between health information dissemination and comprehension, policymakers, educators, and community healthcare practitioners can foster a more health-literate society. Future research should prioritize equitable media access, culturally relevant content, and collaborative programs that combine traditional media with school-based health literacy interventions. Such approaches are essential for advancing the Sustainable Development Goal of inclusive and equitable quality education while addressing persistent health inequities in South Africa.

6. Recommendations

This study offers three key recommendations. First, parents and legal guardians should actively supervise and select the television content viewed by adolescents and young adults in their households. Second, stakeholders and educators in provinces with high illiteracy should explore the feasibility of integrating programs such as LifeLab-Soweto and MM-EE into subjects like Life Orientation to enhance awareness of health-related information. Finally, provincial governments should prioritize recruiting CHWs who play a critical role in disseminating health information within these high-illiteracy regions.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study. Link for description https://www.datafirst.uct.ac.za/dataportal/index.php/catalog/729.

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Abbreviations

The following abbreviations are used in this manuscript:

CHW	Community healthcare workers
HSRC	The Human Sciences Research Council
ICF	Inner-City Fund
MM-EE	Multi-media education entertainment
SADHS	South African Demographic Health Survey
SAMRC	South African Medical Research Council

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