

ORIGINAL ARTICLE

Community Acceptance and Willingness to Participate in Verbal and Social Autopsy (VASA) in Bauchi, Nigeria; A Cross Sectional Study

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Abstract

Background: Verbal and Social Autopsy(VASA) is a meticulously conceptualized framework established by the World Health Organization (WHO) to systematically document and determine the predominant causes of mortality within a given community, particularly in low- and middle-income countries, where the majority of deaths occur outside of hospital settings. This study aims to determine acceptance and willingness to participate in verbal and social autopsy in selected communities of Bauchi, Nigeria.

Methods: A descriptive cross-sectional study was conducted between June and December 2024 with 289 adult residents of selected communities in the Bauchi Local Government Area (LGA) of Bauchi State, Nigeria. Participants were enrolled using multi-stage sampling technique. Data were collected using a semi-structured questionnaire and analyzed with SPSS (version 23).

Results: A total of 289 participants were interviewed. The mean age of the respondents was 39 and a standard deviation of 9.6. A significant proportion of the participants are married (78. 2%), the majority are Hausa-speaking (34. 6%) and are males (64. 0%), business owners (31. 5%) and have a tertiary level of education (56.4%). The findings indicated a high proportion of poor knowledge (87.2%), although 67.5% expressed willingness to accept and participate in VASA. Logistic regression analysis showed that age, sex, occupation, educational attainment and monthly income serve as predictors of knowledge, while marital status, educational attainment, occupation and monthly income are significant predictors of willingness to accept and participate in VASA.

Conclusion: This study explored community acceptance and participation in verbal and social autopsy processes in selected communities within Bauchi town. Although the study indicates a willingness to embrace VASA, a significant deficiency was observed in understanding VASA. The study underscores the need for targeted educational interventions to improve community understanding and acceptance of verbal and social autopsy processes in Bauchi, as well as the need for continuous operational research to explore evolving community perceptions, assess the effectiveness of current engagement strategies, and identify innovative approaches to improve participation in VASA.

Keywords: Verbal Autopsy, Social Autopsy, Community, Bauchi

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Introduction

Verbal autopsy is a vital tool used to determine the cause and circumstances surrounding a person's death, particularly in regions where formal medical death registration systems are either non-existent or poorly developed [Patel et al. 2016](#). This method involves conducting interviews with relatives or caregivers of the deceased, allowing them to recount the events that led to the death [Bentley and O'Connor 2015](#). By gathering detailed narratives on symptoms, medical history, and the context of death, verbal autopsy provides critical informa-

tion on mortality patterns in communities that may otherwise remain invisible in health statistics [Murray et al. 2011](#).

In many low-resource settings, particularly in rural or underserved areas, most deaths occur at home without medical documentation [Mwanyangala et al. 2011](#). Consequently, traditional methods of recording mortality data fall short, leading to significant gaps in understanding the health challenges faced by these populations. Verbal autopsy emerges as a practical and effective solution to bridge this gap, offering a means to collect reliable mortality data that can inform healthcare strategies and public health policies [Stewart et al. 2013](#). Complementing verbal autopsy is the concept of social autopsy, which broadens the scope of analysis by engaging the community in identifying social determinants that contribute to mortality. This approach focuses on social, economic and environmental

factors that can influence health outcomes, thus improving the understanding of the underlying causes of death [Baset et al. 2012](#). By examining these social dynamics, social autopsy aims to raise awareness within communities about preventable deaths, particularly among vulnerable groups such as mothers and children. VASA encourages community participation in health initiatives, fostering a sense of ownership and responsibility to improve health outcomes [Waiswa et al. 2012](#); [Setel et al. 2007](#). The integration of verbal and social autopsy methodologies is particularly crucial for generating population-level data that can be used by healthcare programmers and policy makers [Waiswa et al. 2012](#). These data are essential for designing targeted interventions, effectively allocating resources, and tracking progress toward sustainable development goals, particularly those related to health and well-being. Despite the challenges posed by inadequate civil registration systems, the combination of verbal and social autopsy offers a robust framework to understand mortality trends and address barriers to healthcare access [Källander et al. 2011](#).

Countries such as Egypt [Metwally and al. 2020](#), Indonesia [Indonesian Ministry of Health 2017](#), Malaysia [Ministry of Health Malaysia 2018](#), Mozambique, Rwanda, China [Yang et al. 2006](#), and Ethiopia have begun to implement VASA methodologies to improve their health data systems [Teklegiorgis et al. 2016](#). Nigeria is one of the LMICs that is actively working to strengthen its health information systems by integrating innovative data collection methods and fostering collaboration between various stakeholders [Welcome 2011](#). The first national verbal autopsy survey in Nigeria was conducted in 2018, marking a significant step towards improving the precision of mortality data and providing information on the underlying causes of death in different regions [Souza 2019](#). However, since then, there has been no significant follow-up survey to assess progress made or to update the data, which is crucial to effectively inform health policies and interventions. This study therefore, aims to assess the community perceptions of VASA and its role in improving health data collection, as well as to identify potential barriers to participation in VASA.

Methods

Study area: This study was conducted in some selected communities in the Bauchi Local Government Area, situated in Bauchi State. The State is positioned in the North-eastern geopolitical region of Nigeria at coordinates 10.30° N 10.00° E. The State is flanked by Kano, Jigawa, Taraba, Plateau, Gombe, Yobe, and Kaduna States. It encompasses a total surface area of 49,119 km², which constitutes approximately 5.3% of Nigeria's overall land area. According to the 2006 census [National Population Commission 2006](#), which reported that the population of Bauchi State was 4,653,066 with a growth rate of 3.7% [Okpala December 1990](#), the estimated population for the year 2025 is projected to be 8,670,000. The State comprises 20 Local Government Areas (LGAs), wherein the Fulani, Hausa, and Gerawa ethnic groups predominate. The predominant faith is Islam, and the primary occupations of the inhabitants include agriculture, livestock rearing, and trade. Bauchi Local Govern-

ment Area is one of the 20 LGAs within the State and serves as the capital of Bauchi State [WHO 2006](#). It consists of 12 wards which are: Majidadi A, Majidadi B, Birshi/Miri, Dan'iya Hardo, Dandango/Yamrat, Dawaki, Galambi/Gwaskwaram, Turwun/Kangyare, Durum/Kundum, Makama/Sarki Baki, Mun/Munsal, and Zungur/Liman Katagum. The population of Bauchi LGA is estimated to be approximately 881,600. **Study design and population** The methodological framework adopted for this investigation was a descriptive cross-sectional study [Xiaofeng and Zhenshun July 2020](#). The subjects of the study comprised the inhabitants of the selected community. Participants included adult residents of the communities who had resided in the community for a minimum duration of six months. Exclusions were made for individuals below the age of 18 at the time of the research, as well as for ill individuals who were unable to participate effectively in the study or who did not provide consent.

Using Fisher's formula [Oladimeji April 2020](#):

$$n = Z^2 \frac{pq}{d^2} \quad (1)$$

where n = minimum required sample size, Z is the standard normal deviate at a 95% confidence interval = 1.96, P = prevalence of 78.2% (0.782) of relatives of the deceased who agreed to participate in the verbal and social autopsy (using a previous study), q = complementary probability, d = maximum sample error allowed (level of precision) at a 95% confidence limit = 5% (0.05), and q = 1 - p.

From the above formula:

$$n = \frac{(1.96)^2 \times 0.782 \times (1 - 0.782)}{(0.05)^2} \quad (2)$$

$$= \frac{3.8416 \times 0.782 \times 0.218}{0.0025} \quad (3)$$

$$= \frac{0.654684096}{0.0025} \quad (4)$$

$$= 261.87 \approx 262 \quad (5)$$

Thus, the minimum sample size calculated was 262. It was increased by 10% to account for non-response [Charan and Biswas April 2013](#). Therefore, a sample size of 289 was used.

Sampling Technique

A multistage sampling technique [Yarahmadi 2020](#) was used to select the study participants. • Stage one (Selection of wards): Out of the 12 wards within the Bauchi local government area, 3 wards (25%) were selected using simple random sampling by balloting. • Stage two (Selection of communities): from the 3 selected wards, 3 communities were selected from each ward at random. • Stage three (Selection of participants): systematic random sampling was used to select respondents from each of the communities. House numbering was done to serve as the sampling frame. Proportion-to-size allocation was made based on the number of participants in each community. Sample fraction was calculated as the ratio of the sample size to the sample frame. The sample interval was the inverse of the sample fraction. The first participant was selected using simple

random sampling by balloting, and subsequent participants were selected using the sample interval.

Study tool and data collection: The study employs a quantitative method of data collection using a questionnaire. An interviewer-administered questionnaire was used to collect data from all eligible and consented respondents. The questionnaire was pre-tested at Wuntin Dada community which shares common characteristics with the actual study communities. The questionnaire consisted of four sections: Socio-demographic characteristics, Knowledge of verbal and social autopsy, Willingness to participate in verbal and social autopsy and Facilitators/Barriers that will encourage or discourage respondents from accepting or participating in verbal and social autopsy.

Data Analysis

Dependent variables: These include awareness and knowledge of VASA. The independent variables includes: Socio-demographic characteristics such as age, marital status, education, occupation, and tribe. **Scoring and grading of variables:** Knowledge was categorized using a binary scale. Each correct response was scored one mark, while zero mark was awarded for a wrong answer or no response. The respondents knowledge were graded as either good or poor. Willingness to participate was scored as either Yes or No or Not Sure. Data obtained was sorted, coded, cleaned, and validated to ensure accuracy and consistency. The data was transferred into Statistical software SPSS Version 23.0 for analysis. A univariate analysis was done, which includes the use of percentages, proportions, and charts for qualitative variables such as sex, tribe, religion, and relationship/marital status. Quantitative variables such as age were summarized using mean and standard deviation (SD). A bivariate analysis including the Pearson's Chi-square test or Fisher's exact test were done to test the association of independent and dependent variables at a 95% confidence interval. A p -value of < 0.05 was considered statistically significant. Multivariate analysis including logistic regression analysis was done to determine the factors and barriers influencing community participation and acceptance of verbal and social autopsy by using the variables that were significant at the level of bivariate analysis, with a p -value of < 0.05 considered statistically significant.

Ethical Consideration

VASA is regarded as a sensitive area of research [DeJong, Sainsbury, and al. 2017](#) that requires careful ethical considerations to protect the rights and well-being of the respondents. Respondents were fully informed about the purpose of this study, their participation rights, and the confidentiality of their responses, ensuring that they provided consent voluntarily without any coercion. Ethical approval was obtained from the Bauchi State Health Research Ethics Committee (HREC), which ensured that the research adhered to established ethical standards and guidelines for conducting studies involving human subjects. This approval process included a comprehensive review of the study design, data collection methods, and potential risks to participants, reinforcing the commitment to uphold the highest ethical practices throughout the duration of the investigation. A written consent form was provided to

each participant, which described the study objectives and their right to withdraw at any time without penalty, thus fostering a transparent environment that prioritized their autonomy and well-being.

Results

The sociodemographic characteristics of the study participants are summarized in Table 1. A total of 289 participants were enrolled in the study, the majority of whom were men, representing 64% of the sample, while the women constituted 36%, indicating a gender disparity in participation. Most of the participants were between 30 and 39 years old, reflecting the predominance of younger adults in the study population. The Hausa speaking population represented the largest ethnic group, followed by the Fulani and other minority groups. Islam is the predominant religion among the participants. The majority of the participants were married, civil servants with a tertiary level of education. Approximately 31% had experienced a death within their family and 84% within their community, one month before the study.

Table 2 shows that a significant majority (87.2%) of the respondents had poor knowledge of VASA (scores < 17). Only 12.8% demonstrated good knowledge (scores > 17).

Table 3 indicate that a majority of the respondents, 195 out of 289 (67.5%) expressed willingness to accept and participate in the Verbal and Social Autopsy (VASA) process, while 94 respondents (32.5%) were not willing to do so. This suggests a generally favorable disposition towards VASA within the community.

Among those who were unwilling to participate, the most common reason cited by nearly half of them (48.9%), was "No reason at all," highlighting possible latent concerns or lack of understanding. Another significant proportion (33.0%) indicated discomfort with discussing death, suggesting a cultural sensitivity or personal reluctance around mortality-related conversations. A smaller group (18.1%) felt that participation in VASA was against their cultural values. In particular, none of the respondents cited religion as a reason for their unwillingness to participate in the VASA process.

Furthermore, the results identified several barriers and influencing factors affecting the acceptance and participation in the Verbal and Social Autopsy (VASA) process Table 4. A significant proportion of respondents (75.4%) believed that participation should only occur after a proper mourning period, indicating the importance of respecting emotional and cultural timelines for bereavement. Additionally, 44.6% of participants described the VASA process as emotionally tasking, while 50.0% expressed discomfort with discussing death, reinforcing the emotional and cultural sensitivities associated with the topic.

About 19. 0% of the respondents also noted concerns about confidentiality, suggesting that trust and privacy are critical to participation. Furthermore, 14.5% felt that discussing death offers no tangible benefit, highlighting a perceived lack of value in the VASA process for some individuals. These insights underscore the need for culturally sensitive engagement strategies

Table 1. Sociodemographic Characteristics of the Study Participants

Variable	Frequency*	Percentage
Age group (Years)		
18-29	55	19.0
30-39	104	36.0
40-49	85	29.4
50-59	39	13.5
60+	6	2.1
Sex		
Male	185	64
Female	104	36
Ethnicity		
Hausa	100	34.6
Yoruba	33	11.4
Igbo	29	10.0
Fulani	57	19.7
Others	70	24.2
Religion		
Islam	204	70.6
Christianity	85	29.4
Others	0	0
Education		
Primary	23	8.0
Secondary	49	17.0
Tertiary	163	56.4
Quranic	34	11.8
None	20	6.9
Occupation		
Civil Servant	86	29.8
Artisan	13	4.5
Business	91	31.5
Farming	28	9.7
None	71	24.6
Marital Status		
Single	33	11.4
Married	226	78.2
Divorced	17	5.9
Widowed	13	4.5
Income		
<N30,000	90	31.1
N30-70,000	102	35.3
>N70,000	97	33.6

Table notes
* n=289

and psychosocial support mechanisms when implementing VASA in the community.

In Table 5, logistic regression analysis revealed several statistically significant predictors of good knowledge of Verbal and Social Autopsy (VASA). Age was a strong predictor, with participants older than 39 years were significantly less likely to have good knowledge of VASA compared to those 39 years

Table 2. Reported Deaths Occurrences A Month Before the Study

Variable	Frequency*	Percentage
Deaths in Family		
Yes	38	31.1
No	251	86.9
Deaths in Community		
Yes	84	29.1
No	205	70.1
Relationship with Deceased		
Father	8	2.8
Mother	8	2.8
Brother	5	1.7
Sister	4	1.4
Others	93	32.2

Table notes
* n=289

Table 3. Knowledge and Willingness to Accept VASA among Participants

Variable	Frequency*	Percentage
Knowledge		
Poor	252	87.2
Good	37	12.8
Acceptance		
Willing	195	67.5
Unwilling	94	32.5

Table notes
* n=289

Table 4. Reasons for Unwillingness to Accept VASA among Participants

Variable	Frequency*	Percentage
Religion	0	0.0
Culture	17	18.1
Death Emotions	31	33.0
No Reason	46	48.9

Table notes
* n=289

or younger (OR = 0.182, 95% CI: 0.113–0.293, $p < 0.001$). Similarly, female respondents were significantly less likely than males to have good knowledge (OR = 0.072, 95% CI: 0.034–0.115, $p < 0.001$).

The level of education also emerged as a key factor. Respondents with tertiary education were significantly more likely to have a good knowledge of VASA than those with only primary education (OR = 0.294, $p < 0.001$). In contrast, Quranic school and no formal education were associated with significantly lower odds of good knowledge, though the exact odds ratios for these categories were extremely small and p -values approached 0.998, suggesting negligible knowledge levels in these groups.

Occupation played a significant role as well. Civil servants had a higher likelihood of good knowledge compared to business owners (OR = 0.096, $p = 0.002$) and those with no

occupation (reference group). Those in artisanal or farming roles were significantly less likely to have good knowledge ($p < 0.001$).

Monthly income was another strong predictor. Participants earning more than ₦30,000 per month were significantly more likely to have good knowledge of VASA than those earning below ₦30,000. Those earning ₦30,000–₦70,000 had very low odds ($OR < 0.001$, $p < 0.001$), and even those earning above ₦70,000 had reduced odds ($OR = 0.121$, $p < 0.001$), suggesting a non-linear income effect or other confounding influences.

The logistic regression analysis identified several statistically significant predictors of willingness to accept and participate in Verbal and Social Autopsy (VASA) among respondents.

Marital status significantly influenced willingness. Compared to single individuals, married participants were significantly less likely to be willing to participate ($OR = 0.395$, 95% CI: 0.296–0.528, $p < 0.001$). However, divorced and widowed participants showed no statistically significant difference in willingness ($p = 0.469$).

The level of education also played a role. Respondents with tertiary education were significantly less willing to participate in VASA compared to those with only primary education ($OR = 0.244$, 95% CI: 0.166–0.360, $p < 0.001$). No significant differences were observed for those with secondary, Quranic, or no formal education.

Regarding occupation, civil servants were significantly more likely to be willing to participate compared to the unemployed (reference group), with an odds ratio of 0.103 (95% CI: 0.050–0.212, $p < 0.001$). Business owners were also significantly more likely to be willing ($OR = 0.569$, 95% CI: 0.371–0.872, $p = 0.010$). However, willingness among artisans and farmers did not differ significantly from the unemployed. Monthly income was another strong predictor. Respondents earning ₦30,000–₦70,000 ($OR = 0.437$, 95% CI: 0.286–0.666) and those earning above ₦70,000 ($OR = 0.169$, 95% CI: 0.096–0.297) were both significantly more likely to be willing to participate in VASA compared to those earning less than ₦30,000 ($p < 0.001$ for both).

Discussion

A substantial proportion of participants enrolled in this study were within the age range of 30 to 39 years, with a mean age of 39.14 years ($SD = 9.60$). Notably, 64% of the 289 respondents were male. This finding contrasts with the 2019 Nigeria verbal and social autopsy study, which was conducted in two states from each of the six geopolitical zones and reported a predominance of female respondents aged 19–40 years, with a mean age of 29 years [Federal Ministry of Health 2020](#). The demographic trend observed in that national study was expected, given its focus on maternal and child health, including neonatal and early childhood mortality. In this study, 34% of respondents were of Hausa ethnicity, reflecting the geographical context of the research, where the Hausa ethnic group is predominant. The 2019 national VASA study noted that the VASA questionnaire had been translated into major local languages—Hausa, Igbo,

Table 5. Logistics Regression Showing Predictors of Knowledge and willingness to accept and participate in VASA

Predictors ^a	Odds Ratio	95% CI ^c	P-Value
Age			
>39	0.182	0.113-0.293	<0.001
Sex			
Female	0.072	0.034-0.115	<0.001
Education			
Tertiary	0.294	0.204-0.424	<0.001
Occupation			
Civil Servant	0.483	0.308-0.758	0.002
Business	0.096	0.047-0.199	<0.001
Income			
>70,000	0.121	0.065-0.226	<0.001
Predictors ^b			
Marital Status			
Married	0.395	0.296-0.528	<0.001
Education			
Tertiary	0.244	0.166-0.360	<0.001
Occupation			
Civil servant	0.103	0.050-0.212	<0.001
Income			
30,000-70,000	0.437	0.286-0.666	<0.001
>70,000	0.169	0.096-0.297	<0.001

Table note

a Knowledge

b Acceptance and Participation

c 95% Confidence Interval

Yoruba, and Pidgin English—to enhance comprehension and inclusivity [Federal Ministry of Health 2020](#). Among the 289 respondents, only 37 (12.8%) demonstrated good knowledge of VASA, and all of them had tertiary education and were either civil servants or business owners. This suggests a strong link between higher educational attainment, socioeconomic status, and awareness of VASA. This trend aligns with the notion that individuals with higher education are more likely to be exposed to health research and public health information. In contrast, several countries have reported higher public awareness and knowledge of VASA due to nationwide implementation and integration into health systems. For instance, India has adopted VASA across rural and urban settings, which has increased public understanding of the tool [Baqui et al. 2006](#). In Kenya, VASA has been used primarily for research, and awareness is widespread among scholars and epidemiologists [Ori and Kyobutungi 2012](#). Malawi implemented VASA for over 3,600 under-five mortality cases, significantly boosting national awareness [D'Ambruoso, Kahn, Wagner, et al. 2016](#). Similarly, Malaysia's Ministry of Health localized VASA for better acceptability, and Thailand introduced VASA in 2005 to monitor deaths occurring outside the country, thus fostering public recognition and acceptance [Azman, Sulong, and Isa 2014; Rao et al. 2007](#). The low level of knowledge observed in this study may therefore be due to limited exposure to VASA

in both the study region and Nigeria as a whole. Interestingly, this study found that 195 respondents (67.5%) were willing to accept and participate in VASA. This level of willingness is comparable to findings from several international studies. In Indonesia, all 143 individuals contacted for VASA consented to participate [Indonesia Ministry of Health 2012](#). In Sierra Leone, VASA was conducted for 222 deaths between 2014 and 2017, with universal acceptance among those contacted [Conteh, Stevens, Bundu, et al. 2017](#). Furthermore, the 2019 Nigeria VASA main report documented 3,075 interviews conducted across 42,000 households, with high levels of voluntary participation and informed consent, especially among female respondents [Federal Ministry of Health 2020](#). Among the 94 respondents (32.5%) who were unwilling to participate in VASA in this study, nearly half (48.9%) did not provide any reason. This contrasts with prior research where cultural and religious beliefs, mistrust, and emotional distress were commonly cited barriers. For instance, in Southeast Asia, VASA acceptability has been shown to improve when local customs and norms are respected [Ma and Tan 2010](#). In Sierra Leone, challenges were primarily linked to the lack of informed consent and stakeholder engagement [Conteh, Stevens, Bundu, et al. 2017](#). Similarly, a VASA study in Enugu, Nigeria, identified cultural and religious resistance and concerns over confidentiality as major barriers [Umeora and Egwuatu 2008](#). Ethical, social, and legal concerns often emerge when conducting verbal autopsies. Cultural beliefs surrounding death vary widely, and sensitivity to local customs is crucial. In this study, one of the most commonly reported barriers was the perceived inappropriateness of conducting VASA during the mourning period. This aligns with global VASA guidelines, which advise against interviewing bereaved relatives too soon after death, as it may cause emotional distress. However, excessive delays may compromise the accuracy of recall [World Health Organization 2016](#).

Conclusion

This study explored community acceptance and participation in verbal and social autopsy processes in selected communities within Bauchi town. The findings revealed that while general awareness of verbal and social autopsy remains limited among community members, there is a growing recognition of its potential benefits to improve maternal and child health outcomes. Most of the participants expressed their willingness to participate in the VASA process when it is introduced with cultural sensitivity, appropriate community mobilization, and confidentiality assurance. The key facilitators of community acceptance included the participation of trusted local leaders, the use of familiar language and culturally respectful approaches, and the belief that VASA could lead to tangible improvements in healthcare delivery. However, barriers such as fear of stigmatization, mistrust of external interventions, and emotional distress associated with recounting traumatic deaths were also identified. The study underscores the importance of community engagement strategies that prioritize respectful dialogue, transparency, and partnership. Strengthening

community health education, training local data collectors and integrating VASA into existing community health structures could enhance its acceptability and sustainability. Continuous operational research is needed to explore evolving community perceptions, assess the effectiveness of current engagement strategies, and identify innovative approaches to improve participation in VASA. In conclusion, successful implementation of VASA in Bauchi state requires a people-centered approach that builds trust, leverages local structures, and addresses the sociocultural context of mortality. Doing so will ensure that VASA not only provides valuable data for policy and planning, but also empowers communities to play an active role in improving health outcomes.

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Competing Interests None to declare.

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