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Social Well-Being and Community Integration Among Veteran Athletes in Bombali and Tonkolili Districts, Sierra Leone: A Cross-Sectional Study

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Abstract

Participation in sport and physical activity may create opportunities for social contact, mutual support and community participation. Few data are available on these social factors for veteran athletes in Sierra Leone. This study examined social well-being and community integration among veteran athletes in both Bombali and Tonkolili districts and its relationship with the two districts. A cross-sectional survey involved 150 veteran athletes aged 35 years and older from Makeni (71) and Magburaka (79), using questionnaire-based social measures. A contingency table was constructed for location and athlete category and analyzed using Pearson chi-square tests, and the effect size was calculated using Cramér's V. The analytical computation of a simple ordinary least-squares regression of community integration on social well-being, from reported sample means, standard deviations, and Pearson correlation, was based on the assumption that all 150 observations were complete and that reported summaries of the data were accurate. Social well-being averaged 4.05 (SD = 0.68) and community integration 4.10 (SD = 0.65). The location-by-athlete-category association was not statistically significant, $\chi^2(2, N = 150) = 0.336$, $p = 0.845$, Cramér's $V = 0.047$. Social well-being correlated with community integration ($r = 0.73$); summary-statistic-derived regression gave $B = 0.698$ (95% CI 0.592–0.804), $R^2 = 0.533$, $F(1,148) = 168.85$, $p < 0.001$. There were more percent in the high activity group than the low activity group for the connectedness (85% vs 40%), participation (80% vs 35%), and belonging (88% vs 38%) measures, but there were not enough numbers in each of the subgroups to run inferential tests. The social scales were strongly positively correlated, and there was no discernible difference in athlete composition between the study locations. Activity-level contrasts are only descriptive and do not have a known number of subgroups. Regression is associational, based on published rounded aggregates, and is not a replacement for participant-level validation. The study contributes local evidence on the social outcomes of sport among veteran athletes in Sierra Leone.

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***Keywords**: Veteran Athletes, Physical Activity, Social Well-Being, Social Connectedness, Community Integration, Sierra Leone.*

Introduction

Sport and physical activity are important to health not only due to their physiological requirements but can also offer opportunities for interaction and shared activity and social relations. Drawing on a systematic review of the evidence on adult sport participation, it was determined that social interaction, social functioning and elements of psychological well-being are outcomes of sport, with the strength and type of associations differing across sport participation contexts (Eime et al., 2013). The results of this research could be a basis for looking at social outcomes instead of assuming that participation equals inclusion. Social well-being is a multidimensional construct. Keyes states that there are five dimensions: social integration, social acceptance, social contribution, social actualization and social coherence (Keyes, 1998). These dimensions are related to one's perception of personal identity in society, relationship with others and their contribution to collective life. Community integration is connected, but not the same as: participation, inclusion and belonging in a community. Literature has proposed various definitions of social participation, which makes it important to present clear operational definitions when comparing studies (Levasseur et al., 2010). Sport can help to foster a sense of community among individuals who share a common experience and can generate social networks outside of an existing one. But sport should not be seen as 'all for one and one for all'. Sport can contribute to certain dimensions of social capital, but the boundaries and differential access to sport and negative sport experiences can limit broader integration, as shown by the experience of Somali participants in Australia (Spaaij, 2012). Therefore, the social contribution of physical activity to some extent depends on the type of activity setting and the opportunities it offers. These may apply to older or master athletes as sporting roles and routines evolve with time. Veteran athletes were operationally defined as athletes who were either past or present participants in organized or recreational physical pursuits 35 years or older. Ongoing involvement could also provide opportunities to keep in touch with peers and sporting communities, but this should not be interpreted as evidence of a causal relationship.

Community sport in rural settings plays a pivotal role in fostering social cohesion and creating social capital by providing opportunities for physical activity and public interaction (Mountifield, 2025). Community sport activities help reduce social barriers, promote inclusivity, and lessen public inequalities in diverse and isolated communities (Mountifield, 2025). Sport-based interventions can act as a link and a unifying force in local communities and as a bridge-builder to the surrounding society (Höglund & Bruhn, 2024). Such density can only be created with the help of other local actors, and without active efforts to build relations with the surrounding society, isolation effects may arise (Höglund & Bruhn, 2024). Access to and engagement with third places influence leisure-time physical activity and social capital among older adults (Yu, 2025). The availability of third places within walking distance and the ease of walking access to third places positively influenced both outcomes (Yu, 2025). Engagement with third places was a significant factor for both leisure-time physical activity and social capital (Yu, 2025). Social support is a relevant resource for physical activity participation among older adults. Social support helps to motivate participation in physical activity of older adults, and a social support-based physical activity program decreased cognitive decline and severity of depression in obese older adults with cognitive impairment (Thummasorn et al., 2025). The level of physical activity in obese older adults with cognitive impairment receiving the program increased by increasing participation in leisure-time physical activity (Thummasorn et al., 2025). Social support was linked to better functional status and physical activity among long-term survivors with coronary heart disease (Elnaggar et al., 2025). These benefits were not sustained after accounting for sociodemographic characteristics and depression, highlighting the need for integrating mental health support alongside social support strategies (Elnaggar et al., 2025). Information and communications technology use directly affected social networks among socially active older Japanese adults (Nakahara & Yokoi, 2024). Social networks directly influenced participation frequency and meaningful social participation (Nakahara & Yokoi, 2024). The indirect effect of meaningful participation significantly improved cognitive function, and the only indirect effect of meaningful interpersonal participation was a reduction in loneliness (Nakahara & Yokoi, 2024).

The quality of social participation was identified as the sole factor that had a positive impact on cognitive function and loneliness (Nakahara & Yokoi, 2024). This evidence suggests that the meaningfulness of social participation, rather than frequency alone, may be central to well-being outcomes in later life (Nakahara & Yokoi, 2024). There is limited evidence available from local contexts involving sport in Sierra Leone. The study focuses on social well-being and community integration of veteran athlete in Makeni District, Bombali District and Magburaka, Tonkolili District. It aims to: (1) explain the reported social well-being and community integration scores; (2) report the reported association between these two scores; and (3) explain the reported differences in social connectedness, community participation and community belonging between low- and high-activity groups. The analyses focus on patterns observed and make explicit statistical limits of verifiability.

Literature Review

Sport and physical activity are important to health not only due to their physiological requirements but can also offer opportunities for interaction and shared activity and social relations. Drawing on a systematic review of the evidence on adult sport participation, it was determined that social interaction, social functioning and elements of psychological well-being are outcomes of sport, with the strength and type of associations differing across sport participation contexts (Eime et al., 2013). The results of this research could be a basis for looking at social outcomes instead of assuming that participation equals inclusion. Social well-being is a multidimensional construct. Keyes states that there are five dimensions: social integration, social acceptance, social contribution, social actualization and social coherence (Keyes, 1998). These dimensions are related to one's perception of personal identity in society, relationship with others and their contribution to collective life. Community integration is connected, but not the same as: participation, inclusion and belonging in a community. Literature has proposed various definitions of social participation, which makes it important to present clear operational definitions when comparing studies (Levasseur et al., 2010). Sport can help to foster a sense of community among individuals who share a common experience and can generate social networks outside of an existing one. But sport should not be seen as 'all for one and one for all'. Sport can contribute to certain dimensions of social capital, but the boundaries and differential access to sport and negative sport experiences can limit broader integration, as shown by the experience of Somali participants in Australia (Spaaij, 2012). Therefore, the social contribution of physical activity to some extent depends on the type of activity setting and the opportunities it offers. These may apply to older or master athletes as sporting roles and routines evolve with time.

Community sport in rural settings plays a pivotal role in fostering social cohesion and creating social capital by providing opportunities for physical activity and public interaction (Mountifield, 2025). Community sport activities help reduce social barriers, promote inclusivity, and lessen public inequalities in diverse and isolated communities (Mountifield, 2025). Sport-based interventions can act as a link and a unifying force in local communities and as a bridge-builder to the surrounding society (Höglund & Bruhn, 2024). Such density can only be created with the help of other local actors, and without active efforts to build relations with the surrounding society, isolation effects may arise (Höglund & Bruhn, 2024). Access to and engagement with third places influence leisure-time physical activity and social capital among older adults (Yu, 2025). The availability of third places within walking distance and the ease of walking access to third places positively influenced both outcomes (Yu, 2025). Engagement with third places was a significant factor for both leisure-time physical activity and social capital (Yu, 2025). These findings inform the design of age-friendly environments that support active lifestyles and foster social engagement (Yu, 2025).

Participation in voluntary sport clubs could help counteract poverty and social exclusion, but those affected by poverty are underrepresented (Oettle, 2025). Financial costs, stigma, concerns about keeping up physically, and lack of social contacts in voluntary sport clubs act as key barriers to participation (Oettle, 2025). Stigma related to appearance, physical ability, and social identity

discouraged participation in mainstream voluntary sport clubs (Oettle, 2025). Low-cost and proactive outreach strategies that address concerns related to performance expectations are crucial for enhancing access (Oettle, 2025). Social support is a relevant resource for physical activity participation among older adults. Social support helps to motivate participation in physical activity of older adults, and a social support-based physical activity program decreased cognitive decline and severity of depression in obese older adults with cognitive impairment (Thummasorn et al., 2025). The level of physical activity in obese older adults with cognitive impairment receiving the program increased by increasing participation in leisure-time physical activity (Thummasorn et al., 2025). Social support was linked to better functional status and physical activity among long-term survivors with coronary heart disease (Elnaggar et al., 2025). These benefits were not sustained after accounting for sociodemographic characteristics and depression, highlighting the need for integrating mental health support alongside social support strategies (Elnaggar et al., 2025).

Social support also moderates the relationship between subjective norms and behavioral intention among older participants in park golf (Kim & Jeong, 2024). Event image significantly affected attitudes, subjective norms, and perceived behavioral control, and these in turn affected behavioral intention (Kim & Jeong, 2024). Among frail older adults, resilience, subjective cognition, and social support were significant predictors of daily activity engagement (Oh et al., 2025). The interaction effect between subjective cognition and social support was significant, showing that subjective cognition predicts daily activity engagement only when specific levels of social support are present (Oh et al., 2025). Physical exercise among older adults had a direct negative relationship with loneliness (Gu et al., 2024). Perceived social support and resilience mediated the relationship between physical exercise and loneliness both independently and serially (Gu et al., 2024). Participation in group events or team sports is valuable for alleviating loneliness caused by a lack of social interaction (Gu et al., 2024). Higher levels of social participation among older individuals were more likely to be classified as stable trajectories in both basic and instrumental activities of daily living (Wen et al., 2024). Increased participation in social activities by community-dwelling older adults may promote healthy aging (Wen et al., 2024). Activities of daily living mediate the relationship between social participation and self-rated health among older adults (Zhou et al., 2025). Those engaged in diverse and agricultural participation exhibit better activities of daily living and self-rated health compared to those with low participation (Zhou et al., 2025). The higher the level of self-reported psychological and physical well-being, the higher the social integration for older adults aged 60 years and over (Oduro, 2024). Social integration varied based on older adults' demographic characteristics, with those in rural communities having lower odds of high social integration (Oduro, 2024).

Information and communications technology use directly affected social networks among socially active older Japanese adults (Nakahara & Yokoi, 2024). Social networks directly influenced participation frequency and meaningful social participation (Nakahara & Yokoi, 2024). The indirect effect of meaningful participation significantly improved cognitive function, and the only indirect effect of meaningful interpersonal participation was a reduction in loneliness (Nakahara & Yokoi, 2024). The quality of social participation was identified as the sole factor that had a positive impact on cognitive function and loneliness (Nakahara & Yokoi, 2024). This evidence suggests that the meaningfulness of social participation, rather than frequency alone, may be central to well-being outcomes in later life (Nakahara & Yokoi, 2024). Diversity and inclusion management is central to organizational science, and studies of sport's contribution to diversity and inclusion in society are plentiful (Næss, 2026). The analysis of diversity and inclusion management in sport organizations generated five categories of findings, including a lack of focus on the management part and an instrumental approach to diversity (Næss, 2026). Stakeholder organizations network and form partnerships to provide school-aged girls with opportunities to participate in and remain involved in organized sport (O'Shea et al., 2025). Linking social capital through network resources and structures including social bonds, trust and reciprocity remains under-explored (O'Shea et al., 2025). Taken together, the reviewed literature indicates that sport

and physical activity can support social well-being and community integration, but that these relationships are conditional on setting, access, social support and the meaningfulness of participation. There is limited evidence available from local contexts involving sport in Sierra Leone. The present study therefore focuses on social well-being and community integration of veteran athletes in Makeni, Bombali District and Magburaka, Tonkolili District. It aims to: (1) explain the reported social well-being and community integration scores; (2) report the reported association between these two scores; and (3) explain the reported differences in social connectedness, community participation and community belonging between low- and high-activity groups. The analyses focus on patterns observed and make explicit statistical limits of verifiability.

Hypothesis Development

The first relationship of interest concerns whether athlete category and study location are independent. Prior studies of sport participation suggest that the composition of sporting groups can differ across settings because access, facilities, and cultural norms vary by location (Eime et al., 2013; Spaaij, 2012). Community sport clubs increasingly have an important role in the development of social cohesion and social capital in rural contexts, and establishing avenues for increasing their influence and capacity is essential to building stronger, more inclusive communities (Mountifield, 2025). Access to third places and engagement with them influence leisure-time physical activity and social capital among older adults, and these factors may differ between localities (Yu, 2025). However, the reviewed literature offers no consistent evidence that veteran athlete categories would be distributed differently across the two district centres examined here, and the available evidence does not support an expectation of systematic compositional differences. Therefore, the following hypothesis has been developed.

H1: *Athlete category and study location are independent.*

The second relationship concerns the association between social well-being and community integration. Keyes (1998) conceptualizes social well-being as including social integration, acceptance and contribution, while Levasseur et al. (2010) emphasize that participation, inclusion and belonging are related but distinct aspects of community life. The higher the level of self-reported psychological and physical well-being, the higher the social integration for older adults aged 60 years and over (Oduro, 2024). Social integration varied based on older adults' demographic characteristics, and those in rural communities had lower odds of having high social integration (Oduro, 2024). Activities of daily living mediate the relationship between social participation and self-rated health among older adults (Zhou et al., 2025). Because perceived social relationships and taking part in community life are related dimensions of social experience, higher social well-being would be expected to accompany higher community integration. Therefore, the following hypothesis has been developed.

H2: *Social well-being is positively associated with community integration among veteran athletes.*

The third relationship concerns whether activity group is associated with each binary social indicator. Prior work indicates that sport can provide opportunities for social interaction and social functioning (Eime et al., 2013), and that common activity can facilitate social networks (Spaaij, 2012). Social support helps to motivate participation in physical activity of older adults, and a social support-based physical activity program decreased cognitive decline and severity of depression in obese older adults with cognitive impairment (Thummasorn et al., 2025). Physical exercise among older adults had a direct negative relationship with loneliness, and perceived social support and resilience mediated this relationship (Gu et al., 2024). Participation in group events or team sports is valuable for alleviating loneliness caused by a lack of social interaction (Gu et al., 2024). The indirect effect of meaningful participation significantly improved cognitive function, and the only indirect effect of meaningful interpersonal participation was a reduction in loneliness (Nakahara & Yokoi, 2024). On this basis, higher-activity veteran athletes would be expected to report higher social connectedness, community participation and sense of belonging than lower-activity athletes. Therefore, the following hypothesis has been developed.

H3: *Activity group is associated with social connectedness, community participation and sense of belonging among veteran athletes.*

Methodology

A cross-sectional descriptive and correlational study was conducted in Makeni, Bombali District, and Magburaka, Tonkolili District, Northern Sierra Leone. Structured questionnaires provided quantitative information on social well-being, community integration and participation in physical activities. Although interviews and focus-group discussions formed part of the broader research design, qualitative findings are not included here because coded transcripts and quotations were not available for verification. The sample comprised 150 veteran athletes aged 35 years and above. The district allocation was 71 participants in Makeni and 79 in Magburaka. The reported participant categories were 30 female veteran athletes, 50 male veteran athletes and 70 male veteran footballers. The sampling plan specified that an accessible population of approximately 300 was considered and that multistage sampling involved geographical stratification, proportionate allocation and simple random sampling. Table 1 presents the distribution of participant categories across the two study locations.

Table 1: Distribution of participant categories by study location

Participant category	Makeni, n	Magburaka, n	Total, n
Female veteran athletes	13	17	30
Male veteran athletes	25	25	50
Male veteran footballers	33	37	70
Total	71	79	150

The study administered structured questionnaires in person at sporting venues in Makeni and Magburaka between January and March 2026. Participants were briefed on the study and provided consent before completing the questionnaire. Questionnaire responses were entered for statistical analysis using IBM SPSS Statistics. Descriptive statistics included means, standard deviations, observed minima and maxima for the two social-outcome scores. Pearson correlation assessed their linear association. Three activity-stratified proportions summarised social connectedness, community participation and sense of belonging. The analyses focused on descriptive outcomes and the relationship between social well-being and community integration. The principal reported estimand was the cross-sectional Pearson correlation between two composite social scores. Descriptive estimands were the means, standard deviations and observed ranges of those scores, alongside activity-group percentages. To add transparent precision estimates without presenting reconstructed calculations as SPSS output, 95% confidence intervals for each mean were computed as mean ± $t(0.975,149) \times SD/\sqrt{150}$, conditional on the full reported sample contributing to each scale. The correlation interval was approximated using Fisher's transformation, $z = \operatorname{atanh}(r)$, with standard error $1/\sqrt{(n-3)}$, followed by back-transformation. These are secondary calculations based on published aggregates; they do not substitute for reanalysis of participant records. The reported p value was retained as originally stated. Chi-square analysis used the observed 2 × 3 district-by-athlete-category frequency table. Expected frequencies were obtained under independence, with Pearson χ^2, two degrees of freedom, standardized Pearson residuals and Cramér's V. The regression specification was community integration = $\beta_0 + \beta_1$(social well-being) + ε. Because respondent-level records were not supplied, regression coefficients, standard errors, sums of squares, confidence intervals and ANOVA were reconstructed algebraically from n = 150, r = 0.73, means of 4.05 and 4.10, and SDs of 0.68 and 0.65. Results are approximate owing to rounding of input aggregates. No multivariable adjustment, residual diagnostics, robust standard errors or activity-group chi-square tests can be validated without participant-level data. Three distinct questions were assessed. H01 stated that athlete category and study location are independent; this was evaluated using the complete 2 × 3 observed-frequency table. H02 stated that the population slope linking social well-being to community integration equals zero; this was evaluated using the algebraic equivalence between the reported Pearson correlation and simple least-squares regression. H03

concerned whether activity group is associated with each binary social indicator; this hypothesis could not be tested because the source manuscript provides percentages without subgroup denominators or counts. Two-sided tests were interpreted at $\alpha = 0.05$. Effect sizes and confidence intervals were considered alongside p values, with non-significant results not interpreted as evidence of equivalence. Python-based calculations used NumPy and SciPy. The chi-square test was computed without continuity correction, which is not applicable to a 2 × 3 table. Cellwise expected frequencies were calculated as the product of the corresponding row and column totals divided by 150. The ordinary least-squares slope was calculated as $r \times SD(Y)/SD(X)$; the intercept was mean(Y) - slope × mean(X). The residual sum of squares was $(n - 1) \times SD(Y)^2 \times (1 - r^2)$, with n - 2 residual degrees of freedom. Conventional standard errors and 95% t-based confidence intervals were calculated from these sufficient statistics. Because all input summaries are rounded to two decimal places, reconstructed inferential results are approximate. No synthetic participant records were created. The geographical contingency table provides six verified cell counts, allowing a genuine Pearson chi-square analysis. The regression uses the published bivariate correlation and marginal summary statistics and therefore provides a mathematically reproducible simple-regression summary, but does not enable examination of raw residuals, nonlinearity, outliers or heteroskedasticity. The reported high- and low-activity percentages are retained solely as descriptive findings. These evidentiary levels are distinguished throughout the results to avoid overstating the strength of the dataset. The study is observational and cross-sectional. Results are therefore described as associations or descriptive differences, not causal effects. The reporting approach follows the general principle that observational findings should be presented with transparent information on participant selection, variables, measurement and analysis.

Results and Discussion

Table 2 presents the sample characteristics. Of the 150 participants, 71 (47.3%) were from Makeni, Bombali, and 79 (52.7%) were from Magburaka, Tonkolili. Female veteran athletes accounted for 30 (20.0%), male veteran athletes for 50 (33.3%), and male veteran footballers for 70 (46.7%).

Table 2: Sample characteristics

Study location / category	n	% of total
Makeni, Bombali	71	47.3
Magburaka, Tonkolili	79	52.7
Female veteran athletes	30	20.0
Male veteran athletes	50	33.3
Male veteran footballers	70	46.7
Total	150	100.0

The observed location-by-category counts allow a directly reproducible test of independence. All six expected counts exceed five (minimum 14.20), satisfying the usual expected-frequency screening criterion. The resulting $\chi^2(2, N = 150) = 0.336$, $p = 0.845$, provides no evidence of a difference in athlete-category composition across the two locations. Cramér's $V = 0.047$ indicates a negligible observed association; non-significance does not prove identical distributions. Table 3 presents the observed, expected, Pearson residual and chi-square contribution for each cell.

Table 3: Observed and expected counts, Pearson residuals and chi-square contributions

Location	Athlete category	Observed	Expected	Pearson residual	χ^2 contribution
Makeni	Female veteran athletes	13	14.20	-0.318	0.101
Makeni	Male veteran athletes	25	23.67	+0.274	0.075
Makeni	Male veteran footballers	33	33.13	-0.023	0.001
Magburaka	Female veteran athletes	17	15.80	+0.302	0.091
Magburaka	Male veteran athletes	25	26.33	-0.260	0.068
Magburaka	Male veteran footballers	37	36.87	+0.022	0.000

Note: *Expected counts are based on row and column marginal totals; Pearson residual = (observed – expected)/√expected. χ^2 is the sum of the six cell contributions. The location-by-category test is not a test of physical activity against social outcomes.*

The athlete-category distribution was comparable across the two locations. In Makeni, female veteran athletes represented 18.3% (13/71), male veteran athletes 35.2% (25/71), and male veteran footballers 46.5% (33/71). The corresponding Magburaka percentages were 21.5% (17/79), 31.6% (25/79), and 46.8% (37/79). These small descriptive contrasts are consistent with the weak overall contingency-table association. Table 4 presents the within-location distribution of athlete categories.

Table 4: Within-location distribution of athlete categories

Category	Makeni n (%)	Magburaka n (%)	Total n (%)
Female veteran athletes	13 (18.3)	17 (21.5)	30 (20.0)
Male veteran athletes	25 (35.2)	25 (31.6)	50 (33.3)
Male veteran footballers	33 (46.5)	37 (46.8)	70 (46.7)
Total	71 (100.0)	79 (100.0)	150 (100.0)

Table 5 presents the chi-square test, assumptions and association strength. Although all expected counts are adequate for the conventional chi-square approximation, the absence of a statistically significant result should not be taken to establish that the underlying district distributions are exactly identical. The test has limited power to detect small differences, and the data were drawn from two district centres rather than a nationally representative athlete sample. Standardized residuals were modest in absolute magnitude, indicating that no single cell dominated the overall test statistic.

Table 5: Chi-square test, assumptions and association strength

Statistic	Estimate	Interpretation
Pearson χ^2	0.3362	Sum of six cell contributions
Degrees of freedom	2	(2 - 1) × (3 - 1)
Two-sided p-value	0.8453	No evidence against independence
Minimum expected count	14.20	All expected counts exceed five
Cells with expected count < 5	0 of 6	Expected-count screening met
Cramér's V	0.0473	Very small observed association
Sample size	150	All reported location/category counts

The mean social well-being score was 4.05 (SD = 0.68), with observed values from 2.00 to 5.00. The mean community integration score was 4.10 (SD = 0.65), with observed values from 2.10 to 5.00. Both means were above the midpoint of the stated five-point scale. The difference between the reported means was 0.05 points, with community integration numerically higher. No paired comparison test was supplied; therefore, the difference should not be interpreted as statistically significant. Table 6 presents the descriptive statistics for the two composite scores.

Table 6: Descriptive statistics for social well-being and community integration

Measure	Mean	SD	Minimum	Maximum
Social well-being	4.05	0.68	2.00	5.00
Community integration	4.10	0.65	2.10	5.00

The standard deviations were similar, indicating comparable dispersion in the two reported composite scores. The aggregate statistics do not show the distribution of individual responses, the proportion selecting each response category or whether there were ceiling effects. They should therefore be interpreted as sample-level summaries rather than evidence that all participants experienced favourable social conditions. Table 7 presents the descriptive precision of the two composite scores.

Table 7: Descriptive precision of the two composite scores

Scale	n	Mean	SD	SE	95% CI for mean	Observed range
Social well-being	150	4.05	0.68	0.0555	3.940-4.160	2.00-5.00
Community integration	150	4.10	0.65	0.0531	3.995-4.205	2.10-5.00

The estimated 95% confidence interval for the mean social well-being score is 3.940–4.160, compared with 3.995–4.205 for community integration. These intervals quantify uncertainty in each separate mean under an assumed complete sample of 150; they are not confidence intervals for the paired difference. Both scores exceed the scale midpoint of 3, but the aggregate means do not reveal whether scores are concentrated near the ceiling or whether particular subgroups report poorer experiences. The mean difference of 0.05 points between the two scales should not be described as statistically significant or non-significant without a properly specified paired comparison and verification of the individual score pairs. Even though the reported correlation could support an approximate paired-difference calculation under complete-case assumptions, the source manuscript does not document that both scale summaries refer to exactly the same complete respondent pairs. Accordingly, no paired hypothesis-test result is asserted here. Social well-being and community integration were positively correlated (Pearson r = 0.73; study-reported $p < 0.01$). This indicates that higher social well-being scores tended to accompany higher community integration scores. The observed correlation indicates a strong positive linear association between the two measures. The correlation is symmetric and does not establish direction. It cannot show whether social well-being leads to community integration, whether integration supports well-being, or whether both are associated with other factors. It also does not establish that physical activity caused either outcome. With community integration as the outcome and social well-being as the predictor, the estimated model is $\hat{Y} = 1.274 + 0.698X$. A one-point higher social well-being score is associated with approximately 0.698 points higher community integration. The model explains 53.29% of sample variation in community integration ($R^2 = 0.5329$; adjusted $R^2 = 0.5297$). The slope is statistically different from zero under the standard simple-regression assumptions, $t(148) = 12.994$, $p < 0.001$. These estimates are derived from published rounded aggregates, not from a fitted respondent-level dataset. Table 8 presents the regression coefficients.

Table 8: Regression coefficients for community integration on social well-being

Predictor	B	SE(B)	t	p	95% CI
Intercept	1.2739	0.2205	5.777	<0.001	0.8382-1.7097
Social well-being	0.6978	0.0537	12.994	<0.001	0.5917-0.8039

Note: *Outcome = community integration. Approximate standard errors and intervals use n = 150 and the conventional homoskedastic simple linear regression formulas; input summaries are rounded.*

Table 9 presents the model summary. The model F statistic tests whether the single regression slope is zero; it is mathematically equivalent to the squared slope t statistic. The correlation confidence interval was calculated using Fisher's z transformation. Neither the association nor R^2 demonstrates that improving social well-being causes increased community integration. Potential common-method variance, scale-item overlap and unmeasured confounding remain important concerns.

Table 9: Model summary and ANOVA for the regression

Model summary	Value				
Pearson r	0.7300				
R^2	0.5329				
Adjusted R^2	0.5297				
Residual standard error	0.4457				
F(1,148)	168.8486				
Model p-value	<0.001				
95% CI for Pearson r (Fisher z)	0.6452-0.7970				
Source	Sum of squares	df	Mean square	F	p
Regression	33.5474	1	33.5474	168.8486	<0.001
Residual	29.4051	148	0.1987	—	—
Total	62.9525	149	—	—	—

The standardized regression coefficient equals the Pearson correlation ($\beta = 0.730$) in a one-predictor model with an intercept. The unstandardized slope of approximately 0.698 implies that

a 0.5-point higher social well-being score corresponds to about 0.349 points higher predicted community integration, while a one-standard-deviation difference in social well-being corresponds to a 0.73-standard-deviation difference in the fitted outcome. These are between-person associations and should not be interpreted as changes produced by an intervention. Table 10 presents predicted community integration at illustrative social well-being scores.

Table 10: Predicted community integration at illustrative social well-being scores

Social well-being (X)	Predicted integration (ŷ)	Interpretation
2.50	3.018	Model-fitted mean, not an observed subgroup mean
3.00	3.367	Model-fitted mean, not an observed subgroup mean
3.50	3.716	Model-fitted mean, not an observed subgroup mean
4.00	4.065	Model-fitted mean, not an observed subgroup mean
4.50	4.414	Model-fitted mean, not an observed subgroup mean
5.00	4.763	Model-fitted mean, not an observed subgroup mean

The predictions are calculated directly from the reconstructed regression equation. They are illustrative fitted values, not additional observations. They should not be extrapolated beyond the reported social well-being range of 2.00–5.00, and prediction intervals for individuals cannot be validated without residual-level information. The fitted value at X = 5 is below the upper scale limit of 5, but the linear model should still be examined for possible bounded-scale and ceiling effects when the raw data become available. Higher proportions of participants in the high-activity group endorsed all three social indicators: social connectedness (85% versus 40%), community participation (80% versus 35%) and sense of belonging (88% versus 38%). Table 11 presents these descriptive contrasts.

Table 11: Social indicators by reported activity level

Social indicator	Low-activity group	High-activity group	Difference (percentage points)
Social connectedness	40%	85%	45
Community participation	35%	80%	45
Sense of belonging	38%	88%	50

The activity-group percentages cannot be transformed into verified 2 × 2 chi-square tables because the low- and high-activity denominators and underlying positive-response counts were not reported. Odds ratios, risk ratios, confidence intervals and p values would therefore be unsupported. A valid follow-up analysis requires the activity classification, subgroup sizes and binary response counts for each outcome; logistic regression additionally requires respondent-level covariates. Table 12 presents the inferential status of each activity-level comparison.

Table 12: Activity-level comparisons and inferential eligibility

Social indicator	Low activity	High activity	Difference (pp)	Inferential status
Social connectedness	40%	85%	45	Descriptive only
Community participation	35%	80%	45	Descriptive only
Sense of belonging	38%	88%	50	Descriptive only

Table 13 presents descriptive percentage-point contrasts and relative proportions. The high-to-low proportion ratios shown in Table 13 are descriptive ratios of the reported percentages, not estimated risk ratios with sampling uncertainty. For instance, the reported prevalence of social connectedness is approximately 2.13 times as high in the high-activity group as in the low-activity group, but the underlying group counts, exact denominators, missing-data handling and definitions of high versus low activity are unavailable. Accordingly, it is not possible to compute valid expected frequencies, Pearson χ^2 values, Fisher exact tests, odds ratios or 95% confidence intervals for these comparisons.

Table 13: Descriptive percentage-point contrasts and relative proportions

Outcome	Low activity (%)	High activity (%)	Difference (pp)	High/low proportion
Social connectedness	40	85	45	2.13
Community participation	35	80	45	2.29
Sense of belonging	38	88	50	2.32

Table 14 presents planned advanced analyses conditional on source-data availability. The appropriate next stage is to verify the questionnaire codebook and obtain one row per participant, including district, athlete category, activity frequency or grouping, scale items, and all social indicators. Composite scores should be recreated according to the prespecified scoring rules. Missing observations should be reported by variable and analysis; multicollinearity, model residuals and sensitivity to scale construction should be examined before claiming an adjusted relationship. Until then, the reported percentages remain an important descriptive pattern rather than an inferential finding.

Table 14: Planned advanced analyses conditional on source-data availability

Analysis	Required source variables	Purpose
Activity × connectedness chi-square	Activity group; connectedness yes/no	Test categorical association
Activity × participation chi-square	Activity group; participation yes/no	Test categorical association
Activity × belonging chi-square	Activity group; belonging yes/no	Test categorical association
Adjusted linear regression	Integration score; well-being score; age; district; category; activity	Estimate conditional association
Binary logistic regression	Binary social outcome; activity; covariates	Estimate adjusted odds ratios
Robustness and diagnostics	Respondent-level scale items and residuals	Assess reliability, influence and assumptions

The findings are generally positive, but the average scores in the social well-being and community integration domains were not in the best range for the 150 veteran athletes in the source study. The mean for community integration was slightly higher than social well-being, but the difference of 0.05 points is not significant and has not been tested with a paired procedure. The most defensible reading would be that the two averages were not different from each other, but rather that one dimension was not necessarily stronger. The positive correlation ($r = 0.73$) indicates that there is a potential relationship between the two social measures. This is conceptually possible as perceived social relationships and taking part in community life are related dimensions of social experience. The framework developed by Keyes (1998) focuses on social integration, acceptance and contribution as aspects of social well-being, and studies of social participation demonstrate that participation is multifaceted and needs to be clearly defined (Levasseur et al., 2010). However, the coefficient should be checked against the original data and may be partly attributable to conceptual and/or item overlap between measures. This concern is consistent with evidence that the quality of social participation, rather than frequency alone, is the factor most closely linked to well-being outcomes in later life (Nakahara & Yokoi, 2024). Activity-group percentages highlight a consistent descriptive pattern: High-activity group reported higher proportions for connectedness, community participation/belonging. This pattern is compatible with evidence that sport can provide opportunities for social interaction and social functioning (Eime et al., 2013). It is compatible with the notion that common activity can facilitate social networks. The results, however, do not indicate that activity led to the differences. The likelihood of participation and/or social outcomes in sport may be greater for those who have more positive social networks, and for those who do not have more positive social networks, there may be multiple factors that affect sport participation and/or outcomes, including but not limited to health, time, income, transport, family responsibilities, and access to facilities. Similar barriers, including financial costs, stigma and lack of social contacts, have been documented among older adults affected by poverty in voluntary sport clubs (Oettle, 2025).

Sport shouldn't be assumed to be a place for everyone to feel comfortable. Spaaij's work is an example of how sports participation can foster bonding yet also presents potential for greater integration and inequity (Spaaij, 2012). The present findings have implications for the interpretation of the findings: favourable aggregate scores do not indicate an equal level of acceptance or belonging among veteran athletes. Variation is also indicated by the lower observed score limits, but these do not provide a summary of the distribution of variation that occurred within participants. This reading aligns with evidence that social integration varies by demographic characteristics and is lower among rural older adults (Oduro, 2024).

The results support H1, since no association was found between athlete category and study location. The results support H2, since social well-being was strongly and positively correlated with community integration. H3 could not be formally tested, although the descriptive pattern was in the expected direction. The regression results are consistent with evidence that social support and social participation are linked to better functional and well-being outcomes among older adults (Gu et al., 2024; Wen et al., 2024; Zhou et al., 2025). They are also consistent with evidence that meaningful social participation is associated with reduced loneliness and maintained cognitive function (Nakahara & Yokoi, 2024).

Practical Applications

The findings offer several practical implications for sport administrators, community organisations and health promoters working with veteran athletes. The strong positive correlation between social well-being and community integration suggests that programmes designed to strengthen one dimension may also influence the other, although the cross-sectional design cannot confirm direction. Community sport clubs in rural settings can foster social cohesion and social capital by providing opportunities for physical activity and public interaction (Mountifield, 2025). Practitioners should therefore prioritise accessible, low-cost activities that bring veteran athletes together regularly, since social support helps to motivate participation in physical activity among older adults (Thummasorn et al., 2025). The descriptive gap between high- and low-activity groups in connectedness, participation and belonging, shown in Tables 11 and 13, suggests that efforts to increase activity levels may be worthwhile, but these contrasts remain descriptive and should not be treated as evidence of effect. Programmes should also address barriers such as financial costs, stigma and lack of social contacts, which have been shown to limit participation in voluntary sport clubs (Oettle, 2025). Ensuring that third places are within walking distance and easy to access may further support both physical activity and social capital among older adults (Yu, 2025).

Theoretical Applications

The study contributes to theory by applying Keyes' (1998) multidimensional model of social well-being and Levasseur et al.'s (2010) taxonomy of social participation to an under-researched population of veteran athletes in Sierra Leone. The strong correlation between social well-being and community integration is consistent with the view that these constructs are related but distinct, and it supports the argument that participation should not be equated with inclusion (Eime et al., 2013). The findings also extend social capital theory by showing that sport-based social benefits depend on setting and access, as argued by Spaaij (2012) and Höglund and Bruhn (2024). The descriptive activity-level pattern is consistent with the idea that meaningful social participation, rather than frequency alone, matters for well-being (Nakahara & Yokoi, 2024). However, the inability to test H3 formally highlights a theoretical limitation: without subgroup counts, claims about activity-level effects remain speculative. Future theory development should incorporate social support and resilience as mediating mechanisms, given evidence that these factors link physical exercise to loneliness outcomes (Gu et al., 2024; Oh et al., 2025).

Policy Applications

Policymakers should consider community sport as a vehicle for social cohesion and social capital in rural and post-conflict settings. The evidence that community sport clubs can reduce social

barriers and promote inclusivity supports investment in local sporting infrastructure and programmes (Mountifield, 2025). Policies should also address the structural barriers that exclude older adults affected by poverty, including financial costs, stigma and lack of social contacts (Oettle, 2025). The finding that social integration is lower among rural older adults suggests that policy efforts should target rural districts such as Bombali and Tonkolili (Oduro, 2024). Programmes that combine social support with physical activity may be particularly effective, since social support helps motivate participation among older adults (Thummasorn et al., 2025). Finally, policies should support the development of accessible third places, as availability and ease of access influence both physical activity and social capital (Yu, 2025).

Conclusion

The study examined social well-being and community integration among 150 veteran athletes in Bombali and Tonkolili districts, Sierra Leone. Social well-being averaged 4.05 and community integration 4.10, both above the scale midpoint. The two scores were strongly positively correlated ($r = 0.73$), and the regression summary indicated that social well-being explained approximately 53% of the variation in community integration. There was no evidence of a difference in athlete-category composition between the two locations. Descriptive contrasts suggested higher social connectedness, participation and belonging in the high-activity group, but these could not be tested inferentially. The study contributes local evidence on the social outcomes of sport among veteran athletes in Sierra Leone and highlights the need for participant-level data to validate these patterns.

Limitations and Future Research Directions

A first limitation is that the regression and correlation estimates were derived from published rounded aggregates rather than participant-level records, which means that residual diagnostics, nonlinearity and outliers could not be examined; future research should obtain respondent-level data and re-estimate the models with full diagnostics. A second limitation is that the activity-group percentages lacked subgroup denominators and counts, so H3 could not be tested; future studies should report subgroup sizes and binary response counts to permit chi-square or logistic regression analyses. A third limitation is the cross-sectional design, which prevents causal inference; longitudinal studies are needed to determine whether social well-being predicts community integration over time or vice versa. A fourth limitation is the focus on two district centres, which limits generalisability to other regions of Sierra Leone; future research should include nationally representative samples and additional districts. A fifth limitation is the absence of qualitative findings, which could have illuminated the lived experiences behind the scores; future work should integrate verified qualitative data to complement the quantitative results.

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