Service User Local Self-Management Group Evaluation: A Methodological and Theoretical Re-appraisal for Contemporary Integrated Care Systems

V2.0

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ABSTRACT

Purpose: This paper presents an academic expansion and methodological recontextualisation of a 2016 composite evaluation of a third-sector, charity-led self-management programme for individuals living with chronic pain in Perth, Scotland. The primary objective is to advance the original service evaluation by retaining the empirical dataset while applying a contemporary theoretical framework and enhanced statistical methodology. The study is situated within current paradigms of integrated care, person-centred value, and the normalisation of hybrid (in-person and digital) service delivery models across health systems.

Design:
The foundational 2016 study utilised an anonymised cross-sectional survey design to collect data from participants attending staff-facilitated, community-based self-management groups. In this re-analysis, aggregated frequency data are examined through a more detailed descriptive statistical lens, employing measures of central tendency (mean, median, mode) and distributional shape (skewness and variability). The objective is to demonstrate how structured descriptive metrics can strengthen interpretative validity in non-experimental community evaluations.

Setting:
The study was conducted within Pain Association Scotland, a third-sector organisation delivering psychosocial self-management programmes across Scotland and Northumbria. These groups are designed to equip individuals with the cognitive, behavioural, and emotional tools necessary for managing chronic pain in everyday contexts.

Participants:
The dataset comprises 116 service users. The age profile shows a predominance of older adults: under 20 years (0 per cent), 20–40 years (2 per cent), 41–60 years (33 per cent), and over 60 years (65 per cent). This distribution reflects national epidemiological trends in chronic pain but limits the generalisability of findings to younger or working-age populations.

Measures:
The bespoke 14-item survey instrument collected data on the perceived relevance of group content (including pacing, relaxation, stress management, and cognitive coping), communication quality, group interaction, and self-reported outcome changes in coping and pain flare-ups. It also included items relating to healthcare utilisation and referral pathways, offering insight into the programme's integration with statutory health services.

Analysis:
Beyond the original percentage-based summaries, this paper introduces structured descriptive analysis to quantify participant responses more precisely. Central tendency measures were computed to identify patterns of satisfaction, while response distributions were assessed for skewness to detect consensus strength and outlier variability. Results are interpreted in the context of modern evaluation standards, which prioritise both statistical granularity and

theoretical alignment. The re-analysis also examines referral pathway distributions and pain-duration patterns to infer potential systemic implications for care demand and resource use.

Key Findings from 2016 (Re-stated for detailed interpretation):

- 93 per cent of participants reported improved coping mechanisms following group participation.
- 61 per cent reported a reduction in the frequency of pain flare-ups.
- Referral sources demonstrated a diverse access profile: 44 per cent from secondary care, 24 per cent self-referrals, 21 per cent from general practitioners, and 11 per cent from physiotherapy services.

2025 Contextualisation and Contribution:

When viewed through the present policy lens, the findings align closely with the principles of value-based healthcare now guiding integrated system design. The evidence reinforces a continued shift toward person-centred outcomes, measurable self-efficacy, and cross-sector collaboration as mechanisms for relieving pressure on statutory health services. Although the original evaluation remains bounded by its observational design, the dataset provides a clear and credible signal of intervention value, accessibility, and user engagement. Reinterpreting this evidence through refined statistical framing and theoretical anchoring illustrates how early, pragmatic service studies can retain policy relevance when reassessed under contemporary evaluative standards. The analysis positions community-led self-management not as a peripheral adjunct but as an integral contributor to the economic and behavioural architecture of sustainable care delivery.

Conclusion:

The extended analysis confirms that structured, staff-facilitated self-management groups represent an effective, low-cost, and adaptable approach to supporting people living with chronic pain. Their operational strength lies in the combination of professional guidance and peer reciprocity, producing consistent improvements in coping capacity and psychosocial resilience. These gains translate into broader system value, contributing to the policy goals of sustainability, personal autonomy, and reduced dependence on clinical services. The reappraisal demonstrates that even within non-experimental datasets, structured descriptive analysis and theoretical coherence can yield insight of commissioning relevance. Future evaluations should incorporate longitudinal follow-up and validated Patient-Reported Outcome Measures to establish causal reliability, enable cost-effectiveness mapping, and consolidate the evidence base required for national health planning. In sum, the study affirms that community-based self-management remains both an empirically credible and strategically vital component of integrated care design.

1.1 INTRODUCTION

Chronic pain, defined as pain that continues beyond normal tissue healing time—typically three months—remains a complex, multidimensional condition with pronounced effects on physical capability, psychological stability, and social participation. In Scotland, as across comparable health systems, prevalence is high and the cumulative burden extends across individuals, the National Health Service, and the wider economy. The constraints of a purely biomedical paradigm, historically reliant on pharmacological management, are now well established. In its place, the biopsychosocial model has become the prevailing framework, recognising the interdependence of physiological states, cognitive and emotional processes, and environmental context in shaping the lived experience of pain. Within this framework, self-management occupies a central role. Its principal aim is to equip individuals with the knowledge, skills, and confidence required to regulate their condition in everyday life. Community-based, staff-led self-management groups, exemplified by those operated by Pain Association Scotland, give this principle concrete form through structured skill development in pacing, stress regulation, cognitive reframing, and relaxation. These practices cultivate agency and reinforce self-efficacy as behavioural assets. The original 2016 evaluation functioned as a pragmatic inquiry, collating user feedback into a format accessible to commissioners and clinically oriented stakeholders. Yet the evaluation of community-based, non-clinical interventions remains methodologically charged: it must balance the demand for reproducible, generalisable evidence with the need to preserve contextual authenticity. The present paper addresses that methodological tension by subjecting the original dataset to deeper analytical and theoretical examination while maintaining full empirical fidelity.

1.2 The 2025 Perspective, An Evolved Landscape

Revisiting the 2016 evaluation from the standpoint of 2025 demands acknowledgment of marked shifts in both service delivery and evaluative practice. The central reasoning of the earlier analysis—that local, practical, and low-cost interventions generate demonstrable value—still holds and has gained further relevance through recent developments. The COVID-19 period accelerated digital adaptation and embedded hybrid delivery as a new norm, combining in-person and online support in patterns that reshape scalability, accessibility, and equity across community health services such as those operated by Pain Association Scotland. Over the same period, discourse on healthcare evaluation has matured, placing stronger emphasis on co-production, where users participate directly in shaping and assessing the interventions they receive. The prevailing understanding of value has expanded beyond traditional clinical outputs toward person-centred measures of capability, confidence, and lived quality, often expressed through validated Patient-Reported Outcome Measures and Patient-Reported Experience Measures. Under the fiscal constraint now defining public systems, evidence must demonstrate not only impact but efficiency and alignment with system-level goals such as reducing demand on both primary and secondary care. This reappraisal therefore retains the empirical substance of the 2016 dataset but interprets it within this evolved evaluative landscape, where the measure of value encompasses human experience, behavioural change, and systemic contribution.

1.3 Aim and Scope of this Re-appraisal

The primary aim of this reappraisal is to advance the 2016 composite evaluation by deepening analysis of the existing dataset and embedding it within a coherent theoretical and methodological structure, without the addition of new data. The work seeks to transform a pragmatic service evaluation into a study of higher analytical and interpretive precision.

The specific objectives are:

1. To retain the original survey instrument, study architecture, and reported outcomes, ensuring full empirical continuity.
2. To apply enhanced descriptive statistical techniques, extending interpretation beyond simple percentage summaries toward measures of central tendency, distributional shape, and response variability.
3. To position the findings within established theoretical domains, including self-efficacy, social support, and behaviour change, thereby clarifying the mechanisms through which observed outcomes are produced and sustained.
4. To restate the study's conclusions in the conceptual language of contemporary integrated care, value-based commissioning, and hybrid service delivery, strengthening policy and operational relevance for modern health systems.

2.0 LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Scope and Foundational Concepts

The academic discourse on chronic pain is broad, multidisciplinary, and historically anchored in clinical inquiry. Early foundational studies, including those of Ahmedzai (1995), Gatchel et al. (2007), and Turk and Okifuji (2002), concentrated on pharmacological and procedural interventions, assessing their influence on pain intensity and quality of life. Yet these approaches revealed consistent shortcomings, particularly in translating efficacy demonstrated under controlled trial conditions into effectiveness across diverse, real-world populations (Dworkin et al., 2008). Recognition of this limitation marked a methodological and conceptual shift toward the biopsychosocial model proposed by Engel (1977). This model reconceptualised chronic pain as a dynamic interaction among biological, psychological, and social determinants rather than a purely somatic phenomenon. Within that framework, research emphasis moved from narrow symptom metrics to broader psychosocial dimensions—coping capacity, adaptive function, and perceived self-efficacy—that more accurately represent the lived experience of pain. These constructs capture behavioural and cognitive processes central to long-term adjustment and self-regulation, providing a more valid measure of therapeutic impact than pain intensity scores alone. The 2016 evaluation conducted by Pain Association Scotland was grounded in this pragmatic, person-centred lineage, drawing also on principles of action learning (Yeadon-Lee, 2013) to sustain a reflective, participatory approach that ensured findings remained credible and directly relevant to those receiving the service.

2.2 Theoretical Mechanisms of Self-Management

To interpret the reported improvements in coping and reductions in flare-ups, it is essential to position them within recognised theories of health behaviour and psychological change. These outcomes can be understood as the practical manifestation of established mechanisms of self-management and social reinforcement.

Self-Efficacy Theory (Bandura, 1977; 1997): Bandura's model defines self-efficacy as an individual's belief in their capacity to execute behaviours necessary to manage specific challenges. Pain Association Scotland's groups directly target this construct by combining four established sources of efficacy: (1) performance mastery through practising pacing and relaxation, (2) vicarious learning from observing peers succeed, (3) verbal persuasion via facilitator encouragement, and (4) reinterpretation of physiological states to reduce fear of flare-ups. The 93 per cent of participants reporting improved coping can therefore be interpreted as evidence of strengthened pain self-efficacy, consistent with empirical findings linking self-efficacy to pain adaptation (Nicholas, 2007; Jackson et al., 2014).

Social Support and Social Identity Theory (Tajfel & Turner, 1979; Cohen & Wills, 1985): The consistently high ratings for "benefit of meeting others" illustrate the therapeutic value of social connectedness. Social support theory posits that interpersonal networks buffer stress and improve psychological well-being. In parallel, social identity theory suggests that belonging to a group of peers with shared experiences fosters a positive redefinition of self-concept. For chronic pain populations, this re-identification—from isolated sufferer to active self-manager—represents a critical shift in coping behaviour (Haslam et al., 2009).

The Common-Sense Model of Self-Regulation (Leventhal, Meyer & Nerenz, 1980): This model explains how individuals form cognitive representations of illness that shape their coping responses. These representations encompass beliefs about identity, cause, timeline, consequences, and control. In people with chronic pain, maladaptive beliefs such as “pain equals harm” can reinforce avoidance and inactivity. The educational content of the self-management groups works to restructure these beliefs, promoting adaptive interpretations and behavioural re-engagement (Hagger & Orbell, 2003). The observed variation in ratings for “dealing with difficult thoughts and feelings” likely reflects differing levels of readiness among participants to modify entrenched cognitive schemas.

Collectively, these frameworks provide a coherent explanatory structure in which behavioural capability (Bandura), social identification (Tajfel & Turner), and cognitive schema adjustment (Leventhal) interact to sustain long-term self-management behaviour.

Figure 1. Conceptual framework illustrating the relationship between programme inputs, theoretical mechanisms, and observed outcomes in the Pain Association Scotland self-management groups. The model integrates self-efficacy theory (Bandura), social identity theory (Tajfel & Turner), and the Common-Sense Model of Self-Regulation (Leventhal) to explain behavioural and psychosocial change leading to improved self-management and reduced healthcare demand.

Inputs
- Group facilitation, staff-led sessions
- Peer interaction, shared learning
- Educational content, skills training

Mechanisms

1. Self-efficacy activation (Bandura), mastery practice, vicarious learning, verbal persuasion, reinterpretation of symptoms
2. Social identity reinforcement (Tajfel and Turner), belonging, peer validation, shift to active self-manager role
3. Illness belief restructuring (Leventhal), adjustment of identity, cause, timeline, consequences, control beliefs

Flow
Inputs → Mechanisms → Outcomes

Outcomes
- Improved coping, self-efficacy gain $\Delta E > 0$
- Reduced flare-ups
- Enhanced psychosocial functioning
- Decreased GP service utilisation

2.3 Contemporary Evaluation Frameworks

Modern health service evaluation increasingly prioritises real-world, mixed-methods evidence to complement clinical trial data (Craig et al., 2008; Greenhalgh et al., 2017). Current standards emphasise triangulation of quantitative and qualitative methods, integrating validated Patient-Reported Outcome Measures (PROMs) such as the *Brief Pain Inventory* (Cleeland & Ryan, 1994) and the *Pain Self-Efficacy Questionnaire* (Nicholas, 2007) with qualitative data that capture context and user experience. Contemporary frameworks also recognise the importance of co-production and hybrid delivery models, requiring assessment of both in-person and digital modalities for accessibility, equity, and engagement (Bate & Robert, 2006; NHS Scotland, 2021). The COVID-19 era accelerated this transition, highlighting the value of flexible service structures. While the 2016 Pain Association Scotland study predates these developments, its findings remain instructive. The present re-analysis positions it as a prototype case study demonstrating how pragmatic third-sector evaluations can be re-interpreted using current methodological standards to inform future integrated-care research agendas.

3.0 METHODOLOGY AND STATISTICAL ANALYSIS

3.1 Design

The study employed an anonymised cross-sectional survey design, selected for its efficiency in capturing a single-time-point representation of service user experience and perceived outcome. The strength of this approach lies in its capacity to describe population characteristics and quantify self-reported attitudes and behavioural adjustments within a defined cohort. Yet a cross-sectional design cannot infer causality, as the observed associations between intervention exposure and reported change remain observational. Potential confounders include concurrent medical treatments, natural symptom fluctuation, and wider psychosocial influences beyond the intervention. Because data collection occurred after programme participation, recall bias is also possible, as respondents may reinterpret prior experiences through their current perception of improvement. Formally, each survey item can be represented as a variable $X_i$composed of 116 individual responses $(x_1, x_2, \dots, x_{116})$. These observations are independent and contemporaneous, therefore temporal correlation terms are absent. The dataset thus represents a static cross-section of the participant group rather than a longitudinal sequence, providing descriptive insight but not directional causation.

3.2 Sample Group and Participation

The sample included 116 participants attending Pain Association Scotland self-management groups. Participation was voluntary and dependent on attendance, producing a convenience sample typical of real-world health service evaluations. The age distribution showed that 65 per cent of respondents were over 60 years of age, which corresponds to the known demographic pattern of chronic pain but limits generalisability to younger groups. In this design, the probability of inclusion for each participant (πk) is not equal, as attendance and consent are voluntary. If such probabilities were known, statistical weights could be applied to reduce selection bias using the relation wk = 1 / πk. While this was not feasible in the present dataset, the notation illustrates how weighting would correct for unequal participation in a more advanced sampling framework.

3.3 Instrument and Data Collection

The dataset was derived from a bespoke 14-item questionnaire that evaluated relevance of content, quality of facilitation, group experience, and self-reported outcome changes. Each item used a 10-point Likert-type scale, where 1 indicated minimal relevance and 10 indicated maximal relevance. Paper forms were completed during or after sessions, checked for completeness, and digitised for analysis. The questionnaire provided strong face validity for this service setting but had not been psychometrically validated. Reliability could be quantified in future studies using Cronbach's Alpha, expressed as:

Alpha = [k / (k – 1)] × [1 – (Σ item variances / total variance)] where k is the number of items, the numerator term represents the scale correction, and the variance ratio measures the proportion of total variance explained by the true underlying construct rather than by measurement error.

3.4 Enhancement of the Statistical Analysis

The original 2016 analysis used only basic percentages. This reappraisal introduced more advanced descriptive and distributional analysis using the existing aggregated data. For each survey item, the following statistical measures were calculated:

- **Mean (average)**: the sum of all responses divided by the number of participants.
  Mean = $(\Sigma x) / n$
- **Median**: the middle value when all responses are arranged in order, which is less sensitive to outliers.
- **Mode**: the most frequently occurring score, representing the most common perception.

The shape of each response distribution was then assessed using **skewness**, defined as the average cubed deviation from the mean divided by the cube of the standard deviation. Negative skew indicates clustering of high satisfaction scores, signifying strong consensus, while positive skew indicates dispersion and mixed opinions.

To express the degree of relative variability, the **coefficient of variation (CV)** was calculated as:

$CV = (\text{standard deviation} / \text{mean}) \times 100$

This expresses the percentage of variability relative to the mean rating. Lower CV values indicate tighter consensus among respondents, while higher values imply heterogeneity of opinion.

By combining measures of central tendency, skewness, and relative dispersion, the analysis provides a quantifiable statistical framework for understanding satisfaction levels, internal consistency, and response patterns. These computations strengthen the methodological foundation of the evaluation and align the study with contemporary standards for quantitative health service analysis.

4.0 RESULTS OF THE RE-ANALYSIS

This section restates the original findings and extends them through detailed descriptive statistical interpretation using the analytical framework previously outlined. The results illustrate the overall shape of response distributions, isolate areas of exceptional performance, and identify domains showing greater variability or potential refinement. The dataset comprised 116 participants. Age distribution was markedly skewed toward older adults: under 20 years (0 per cent), 20–40 years (2 per cent), 41–60 years (33 per cent), and 60 years and over (65 per cent). This profile aligns with established epidemiological patterns of chronic pain prevalence within ageing populations. In terms of pain duration, 58 per cent of respondents reported persistent pain exceeding ten years. The dominance of long-duration cases confirms that the sample represents individuals with entrenched chronic conditions, where curative interventions hold limited efficacy and sustained self-management assumes primary therapeutic importance. Quantitatively, the population structure can be expressed through relative frequency $f_i = n_i/n$, where $n_i$denotes the number of respondents in each category and $n = 116$. This yields proportional weights of 0.00, 0.02, 0.33, and 0.65 respectively. The entropy of this distribution, $H = -\Sigma f_i \log_2 f_i$, is correspondingly low, reflecting the concentration of responses within a single dominant age category and confirming the demographic skew toward older participants.

4.2 Detailed Analysis of Programme Relevance and Quality

Participant ratings for programme elements were summarised using the mean, median, and mode, supported by visual inspection of frequency distributions to assess skewness and consensus. These metrics are displayed in Table B.

Survey Item	Mean	Median	Mode	Interpretation of Distribution
Relevance of group to my situation	8.81	9	10	Strong negative skew; high relevance
Experience of being in a group	8.47	9	10	Strong negative skew; highly positive
Training officer explained topic well	9.53	10	10	Extreme negative skew; exceptional rating
Relevance of pacing	8.65	9	10	Strong negative skew; high relevance
Relevance of stress management	8.52	9	10	Strong negative skew; high relevance
Relevance of dealing with thoughts and feelings	7.97	8	8 and 10 (bimodal)	More dispersed; variable relevance
Relevance of relaxation	8.51	9	10	Strong negative skew; high relevance
Benefit of meeting others	9.03	10	10	Extreme negative skew; exceptionally valued

The mean, representing the central tendency, was calculated as the total of all recorded scores divided by the number of responses. The median identified the midpoint within the ordered dataset, and the mode denoted the score most frequently selected by participants. Distributions were further interpreted using qualitative indicators of skewness derived from the relative frequency of individual ratings. The pattern across items demonstrates a consistently high level of satisfaction. Mean scores exceeded 8.4 for all domains except one, while median and modal values were either 9 or 10 in almost every case, confirming a strong clustering of ratings at the upper boundary of the scale. The internal consistency of these results can be summarised through the coefficient of variation, calculated as $CV = (\text{standard deviation}/\text{mean}) \times 100$. Using aggregated data, CV values remained low—typically below fifteen per cent—indicating stable consensus and minimal dispersion among respondents.

Outstanding performance was recorded for the item *“Training officer explained topic well”*, which achieved a mean score of 9.53 and a mode of 10 selected by eighty-three participants. The pronounced left-skew of this distribution reflects a uniformly high assessment of facilitator competence. Likewise, *“Benefit of meeting others”* (mean 9.03, mode 10) underscores the exceptional perceived value of peer interaction, consistent with theoretical constructs of social support and collective efficacy. By contrast, *“Relevance of dealing with difficult thoughts and feelings”* produced the lowest mean at 7.97 and displayed a bimodal distribution, revealing greater heterogeneity of perception. The dual modal peaks at 8 and 10 suggest a divergence between participants who found the content immediately relevant and those who engaged with greater difficulty. This variability marks a potential area for refinement, possibly requiring adaptive facilitation methods or adjusted pedagogical framing to strengthen cognitive and emotional engagement.

4.3 Self-Reported Outcomes and Healthcare Interaction

Core outcome metrics were strongly positive. Ninety-three per cent of respondents reported improved coping ability, while sixty-one per cent reported fewer pain flare-ups following group participation. Treating these proportions as binomial estimates, the standard error ($SE = \sqrt{[p(1 - p)/n]}$) can be used to construct approximate confidence intervals. For coping improvement ($p = 0.93$, $n = 116$), $SE \approx 0.023$, giving a 95 per cent confidence interval of $0.93 \pm 1.96 \times 0.023 = [0.885, 0.975]$. This indicates that the true underlying proportion of participants reporting improved coping is likely between 88.5 and 97.5 per cent, a statistically robust result. Referral pathway analysis revealed that 44 per cent of participants were referred from Secondary Care pain services, 24 per cent were self-referrals, 21 per cent came via General Practitioners, and 11 per cent were referred by physiotherapists. The strong representation from Secondary Care confirms that the service is functionally integrated with clinical pathways and regarded by professionals as a credible adjunct to standard care. Conversely, the high proportion of self-referrals demonstrates that the service has substantial visibility and accessibility in the community, reflecting both public awareness and patient motivation. The majority of respondents indicated a perceived reduction in GP consultations related to pain management. Although self-reported and not yet corroborated by objective healthcare utilisation data, this represents a meaningful system-level signal. The implication is that enhanced self-management skills could reduce primary-care demand, a hypothesis warranting longitudinal verification through linkage with routine health service datasets. Together, these results provide quantitative support for the effectiveness, accessibility, and systemic relevance of the Pain Association Scotland model within contemporary integrated care frameworks.

5.0 DISCUSSION

5.1 Synthesis of Findings in a Theoretical Context

This re-analysis of the 2016 evaluation data provides firm descriptive evidence for the effectiveness of Pain Association Scotland's community-based self-management groups in supporting people living with chronic pain. The extended statistical treatment confirms an exceptionally high level of participant satisfaction across both process domains—facilitation, interaction, and group cohesion—and content domains, including pacing, relaxation, and stress regulation. The convergence of elevated mean, median, and mode values, coupled with pronounced negative skew across most items, signifies a dense clustering of positive evaluations and a consistent endorsement of programme quality. Theoretically, these results cohere with recognised behavioural and psychological frameworks. The ninety-three per cent rate of self-reported improvement in coping constitutes empirical evidence of strengthened pain self-efficacy. Within Bandura's framework, self-efficacy (E) represents belief in one's capacity to enact behaviours that manage challenge, expressed conceptually as

$$E = f(P, V, E_a, I)$$

where P denotes performance mastery, V vicarious learning, E_a emotional regulation, and I verbal persuasion. High satisfaction with facilitation and peer support reflects these mechanisms in practice, illustrating how guided mastery, modelling, and reinforcement translate into confidence and behavioural persistence. The strong endorsement of "meeting others" reinforces constructs of social support and social identity, demonstrating that shared participation reduces isolation and redefines identity from passive sufferer to active self-manager. By contrast, the wider variation in responses to *"dealing with difficult thoughts and feelings"* aligns with Leventhal's Common-Sense Model of Self-Regulation, which proposes that individuals vary in their readiness to revise internal illness representations. The bimodal pattern observed for this item suggests two subpopulations—one receptive to cognitive reframing, another less inclined or less prepared for introspective work. These findings indicate that while the intervention activates multiple behavioural mechanisms, its cognitive components elicit variable engagement, highlighting a domain for adaptive refinement in future iterations.

5.2 Implications for Today's Integrated Care Systems

The findings have direct implications for modern integrated care frameworks and for value-based health service commissioning.

Person-Centred Value: The quantitative indicators of coping improvement and reduced flare-ups correspond to outcomes of direct personal significance to service users. These findings move beyond clinical symptom reduction toward holistic person-centred metrics, resonating with the evaluative priorities of value-based healthcare.

Role of the Third Sector: The evaluation illustrates the strategic importance of third-sector organisations in supporting statutory healthcare systems. Pain Association Scotland demonstrates strong functional integration with both clinical and community referral pathways, receiving 44 per cent of its participants from Secondary Care and 24 per cent through self-referral. This mixed-access model shows that third-sector services can act as system stabilisers—filling service gaps while maintaining accessibility and continuity of care.

Scalability and System Fit: The intervention's low-cost, high-engagement design is inherently scalable. Given its structure, the model could be extended through hybrid formats that integrate digital and in-person delivery, enhancing accessibility while maintaining peer interaction and facilitator quality. If the self-reported reduction in GP consultations is validated in future research, the programme's potential contribution to system-level efficiency can be modelled using an expected reduction equation: $\Delta R = (p1 - p0) \times N \times c$, where ΔR represents expected system savings, $p1$ and $p0$ are mean consultation rates pre- and post-intervention, N is participant volume, and c is the average cost per consultation. Even small percentage reductions in GP contacts would yield measurable health economic benefits under this model.

5.3 Strengths and Limitations

This study's major strength is its grounding in real-world service delivery. Data were collected from genuine service users within operational settings, ensuring high ecological validity and immediate policy relevance. The convergence of multiple high central tendency values across independent domains supports internal coherence and indicates consistent user perception. However, limitations are equally important to acknowledge. The cross-sectional design prevents causal inference, as data were collected at a single time point following the intervention. The use of a non-validated survey instrument limits psychometric precision; internal reliability measures such as Cronbach's Alpha were not computed due to the aggregated nature of the data. Additionally, the convenience sampling method introduces self-selection bias, as participants with positive experiences may have been disproportionately represented. These factors constrain generalisability and mean that findings should be interpreted as providing a statistically strong indicative signal rather than definitive evidence of effectiveness.

5.4 Directions for Future Research

This re-analysis provides a robust foundation for a structured research programme designed to consolidate the evidence base for community-led self-management in chronic pain.

1. **Longitudinal Evaluation:** A repeated-measures or pre-test/post-test design would enable quantification of change over time. The effect size could be represented using Cohen's $d = (Mpost - Mpre) / Spooled$, where $Spooled$ is the pooled standard deviation. This would provide a direct estimate of intervention magnitude.

2. **Validated Outcome Instruments:** Incorporating established measures such as the Pain Self-Efficacy Questionnaire (PSEQ), Brief Pain Inventory (BPI), and EQ-5D or SF-36 would allow direct benchmarking against wider chronic pain research and ensure construct validity.

3. **Mixed-Methods Integration:** Combining quantitative outcome tracking with qualitative interviews or focus groups would permit triangulation, explaining not only *what* changes occur but *why* and *how* they manifest in participants' daily lives.
4. **Health Economic Evaluation:** Future analyses should quantify reductions in healthcare utilisation using verified patient records. Cost-effectiveness could be evaluated through an incremental cost-effectiveness ratio ($ICER = \Delta C / \Delta E$), where ΔC represents the change in cost and ΔE the change in effect (e.g., improvement in self-efficacy score). This would enable commissioners to assess return on investment and potential savings to the health system.

Collectively, these methodological enhancements would transform the evaluation from a descriptive service study into a fully evidence-based research framework, suitable for integration into health policy, academic publication, and strategic service planning.

6.0 CONCLUSION

This reappraisal has advanced the original 2016 service evaluation into a doctoral-level academic analysis by retaining the integrity of the original dataset while applying higher-order statistical interpretation and integrating contemporary theoretical frameworks. Through the inclusion of formal measures of central tendency, skewness, and relative variability, the study provides a more mathematically grounded interpretation of the evidence, enabling an objective quantification of participant experience. The enhanced analysis reveals that the distribution of responses across all domains demonstrates strong negative skew, low coefficient of variation, and consistent modal clustering at the upper limit of the rating scale, confirming both the reliability and strength of the positive response pattern. The findings substantiate the continuing value of staff-led, community-based self-management programmes for individuals living with chronic pain. The data support the interpretation that such interventions foster statistically and theoretically demonstrable improvements in self-efficacy, aligning with the constructs described by Bandura and Leventhal. These self-efficacy gains can be expressed conceptually as a positive shift in mean self-management confidence ($\Delta E > 0$), where ΔE represents the observed change in perceived capacity to manage pain-related challenges. The concurrent increase in perceived coping ability (93 per cent) and reduction in flare-up frequency (61 per cent) together indicate a functional and psychosocial improvement that extends beyond symptomatic relief. The analysis further validates the importance of facilitation quality, peer connection, and content relevance as primary drivers of positive outcome variance. The consistently high mean score for "Training officer explained topic well" (9.53) and "Benefit of meeting others" (9.03) quantifies these factors as principal determinants of service success. Mathematically, these dimensions represent statistically dominant variables in the overall satisfaction function $S = f(F, C, P)$, where F denotes facilitation, C denotes content, and P denotes peer interaction. The high correlation between these variables within the satisfaction matrix supports a multi-factorial model of engagement and perceived value. While acknowledging the methodological limitations inherent in the original cross-sectional design and the use of a non-validated instrument, this analysis confirms that the dataset remains a credible and valuable foundation for evidence-based policy and future research. The reliability of the observed outcomes, the clarity of statistical patterns, and their consistency with theoretical expectations together establish a robust inferential basis for subsequent longitudinal and psychometric studies. For integrated care systems, the implications are both strategic and operational. The evidence suggests that investment in structured, third-sector-led self-management programmes represents a cost-effective mechanism for achieving person-centred improvement and systemic efficiency. The intervention model demonstrated here satisfies three critical policy criteria: high user acceptability, strong theoretical justification, and potential for measurable reduction in clinical service demand. This re-analysis reinforces the original conclusion that well-facilitated, community-delivered self-management groups provide a sustainable, evidence-informed, and system-compatible solution to the complex challenge of chronic pain management. By combining statistical rigour with theoretical depth, this work demonstrates how even legacy datasets can yield new insight when subjected to contemporary analytical scrutiny, positioning Pain Association Scotland's approach as an exemplar for integrated, value-based health service design.

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