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Voices Through Images: A Photo-Voice Study on Nutrition among Patients with Rheumatoid Arthritis, Cancer, and Type 2 Diabetes

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ABSTRACT

As a participatory visual approach, photovoice is increasingly becoming a powerful tool that is used to document and reflect lived experience regarding health and nutrition. **Objectives:** To determine the leadership nutrition-related issues, hindrances, and enablers that affect the eating habits of people with cancer, rheumatoid arthritis (RA), and type 2 diabetes in clinical and social settings. **Methods:** Photovoice was adopted to explore the diet-related issues in cancer, rheumatoid arthritis (RA), and diabetes patients, three chronic illnesses where dietary control is a critical part of the remedy. Patients were asked to capture some images of the food environment that they encounter daily, obstacles to obtaining appropriate nutrition, and encounters with nutritional education within the clinical setting. **Results:** The analysis resulted in four themes: (1) structural constraints, such as cost and limited access to food; (2) poorly written or standardized dietary prescriptions, which were incompatible with clinical management; (3) perceived need to have formal support provided by registered dietitians; and (4) patient coping strategies which exhibited their resilience and adaptation in the context of financial and clinical restrictions. Patients emphasized the inconsistency of nutritional advice provided by non-experts and its contradictory nature. The level of the problems was demonstrated by photo-stories of naked shelves, inappropriate proportions of portions, and self-designed diets. **Conclusions:** The findings suggest that the role of registered dietitians in multidisciplinary team care should be considered crucial to ensure the maximum patient outcome and the minimization of the risks of disease complications.

INTRODUCTION

Some of the most demanding health problems affecting people worldwide are cancer, rheumatoid arthritis (RA), and diabetes, which result in significant morbidity, mortality, and economic costs (World Health Organization [1]. The issue of nutrition plays a major role in the prevention, treatment, and prognosis of these illnesses, and normally, patients are faced with dire barriers to the provision of appropriate and individualized dietary data[2]. Despite nutrition being well-known as an essential, healthcare systems do not tend to engage a registered dietitian to do their best, resulting in patients being left to depend on generic-based recommendations, misinformation, or advice by the non-specialist [3]. In the case of cancer patients, the cases of side effects of cancer treatment, such as nausea, anorexia, or changes in taste, which make it hard to consume nutrients, can be addressed [4]. Rheumatoid arthritis spares the impact of appetite and nutrition, and patients are mostly left alone to handle conflicting information on the topic of anti-inflammatory diets [5]. Similarly, dietary control is also an essential component of diabetes management; however, patients often cite socioeconomic factors, adherence to traditional diets, and a lack of personalized attention as reasons for nonadherence to medical nutrition therapy [6, 7]. These

complications are augmented by endemic gaps in healthcare delivery systems in which nutrition often has a low priority in contrast to pharmacological care. Participatory research methods are becoming more popular in health sciences to understand such lived experiences in a better manner. Photovoice, a visual technique that allows participants to document and describe their lives using photography, which was first developed by Wang and Burris in 1997, is a qualitative technique that is a visual technique in itself. Compared to fixed surveys or interviews, photovoice enables patients to share their hardships, strategies, and hopes in a narrative and visual format, providing researchers and policymakers with valuable insights [8, 9]. Photovoice has been utilized in food insecurity and adolescent nutrition research, but little has been done on the use of photovoice in identifying the nutrition barrier in cancer, RA, and diabetes patients [10]. The proposed study attempts to fill this knowledge gap by applying photovoice to understand the perceptions and experiences of patients with such chronic conditions in relation to nutrition barriers. Engaging patients as co-researchers enables the research to not only record structural and systemic encumbrances but also record patient demands for more predictable, evidence-based nutrition services by registered dietitians. It is expected that the findings (visual and narrative) generated by photovoice will be useful in informing clinical practice and policy to make nutrition a key pillar of chronic disease management.

This study aimed to explore the lived nutrition-related challenges, barriers, and facilitators influencing dietary practices among individuals with cancer, rheumatoid arthritis (RA), and type 2 diabetes within clinical and social contexts.

METHODS

This study employed a qualitative photovoice design within a community-based participatory research framework. Photovoice was selected because it enabled patients to capture and comment on their visually and narratively described nutrition-related challenges. The research targeted cancer, rheumatoid arthritis (RA), and diabetes patients, where diet is crucial in the management of the diseases, but is underemphasized from the patient's point of view. The study was done in the period between January 2023 and April 2023. All of the participants had signed informed consent in writing. The participants were informed that they had the right to withdraw any penalty-free. In order to prevent the problems of confidentiality, the participants were reminded that they were not to take pictures of identifiable objects. Anonymity was applied to

images and stories at analysis and dissemination. The adult patients (at least 18 years old) who had a diagnosis of one of the three chronic diseases (cancer, RA, or diabetes) during six months or longer were the participants of the study. Outpatient clinics and patient support groups in the Pakistani urban hospitals were used for recruitment. The sampling was purposive in order to be representative in terms of gender, age groups, and socioeconomic status. Data saturation was used as the sample size guide, which implied the interviews would go on until there was no new code or idea. The point of saturation was reached when the last two interviews did not yield more thematic information, and this fact proved that there was sufficiency in the sample. Out of the 35 people who were recruited, 24 were able to follow through with all the procedures of the study and were included in the final analysis; the other 11 did not in the end and failed to provide photos/interview information. The participants underwent an orientation workshop where they were oriented to the objective of the research, ethical concerns, and basic photography skills. Each of the participants was provided with a disposable or online camera (or used their personal smartphone) to shoot photos that would present their experiences of life during the period of two weeks. The overall study period was about four months, consisting of a one-week introduction workshop, two weeks of photography period, and the following focus group discussions and individual interviews that will be undertaken during the next six weeks. The participants were asked to capture the picture that was representative of: 1) Barriers to nutrition (e.g., food insecurity, cost, side effects of treatment); 2) Experiences with diet advice or medication (e.g., the obvious, confusing, or contradictory instructions); 3) Impressions of professional nutrition care (e.g., what might professional nutrition care do). The semi-structured focus group discussions (FGDs) and individual interviews followed the photography session to give the participants context for their photos. What is really happening? What is the relevance of this to our lives? Why does this problem exist? What can we do about it? Audio-recorded all interviews and FGDs were transcribed verbatim and analyzed along with photographs prepared by participants. Visual materials, symbolism, and contextual meaning were analyzed in each photograph, given the description by the participants in interviews. The visual data and the images were coded in order to form recurrent image patterns and stories. The thematic analysis has been undertaken based on a six-step model by Braun and Clarke [12]. Two researchers coded all transcripts independently to increase the level of reliability. Cohen's kappa (0.81) was used as a measure of inter-coder agreement, which showed high agreement. Variations were debated during consensus sessions and

sorted out by repeated improvements to the definitions of codes up to the stage of complete consensus. The codes were inductively generated, and the visual, as well as the narrative codes, were coded by two independent researchers to achieve reliability. Similarities and specific differences to a specific condition were assessed by comparing emerging themes among the three groups of patients (diabetes, RA, cancer). To compute the co-occurrence frequency of key codes between participant accounts in the semantic analysis of the semantic network, the NVivo matrix query function was used. Nodes (themes) were connected using co-appearance in a particular participant response or narrative, and the strength of any connection was a measure of how often this co-appeared. The semantic network analysis was used to display connections among codes. The qualitative network research best practices were used to set the minimum threshold of co-occurrence of ≥3 to exclude chance code pairs and to emphasize relevant conceptual associations. In the resulting network, node size represented code frequency, edge thickness reflected the strength of co-occurrence between codes, and modularity clustering was used to identify communities of closely related concepts. For ensuring credibility, member checking was done through the provision of early findings to participants for their feedback. Triangulation of data sources (interviews, FGDs, and photographs) guaranteed validity. Dependability was maintained through audit trails of the analytic process. Transferability was ensured through the provision of thick descriptions of contexts and experiences of the participants.

RESULTS

Demographic and clinical profile of the participants is presented. Mean age in the three groups was 48.0 years (SD = 8.5). Most of them were female (75%), and the proportion was highest in the RA group (87.5%). Most (62.5%) had education at or below secondary level, and two-thirds (66.7%) had a monthly household income of less than PKR 30,000, suggesting socioeconomic vulnerability. Illness duration was inconsistent among groups, with the longest average duration reported by RA patients (7.2 years), followed by diabetes (6.1 years) and cancer (3.5 years) (Table 1).

Table 1: Sociodemographic Characteristics of Patients (n=24)

Variables	Cancer (n=8), n (%)	RA (n=8), n (%)	Diabetes (n=8), n (%)	Total (n=24), n (%)
Age	48.5 (9.2%)	45.1 (8.7%)	50.4 (7.8%)	48.0 (8.5%)
Female	6 (75%)	7 (87.5%)	5 (62.5%)	18 (75%)
Male	2 (25%)	1 (12.5%)	3 (37.5%)	6 (25%)
Education (≤Secondary)	5 (62.5%)	6 (75%)	4 (50%)	15 (62.5%)
Monthly Income < PKR 30k	6 (75%)	5 (62.5%)	5 (62.5%)	16 (66.7%)
Duration of Illness (Years)	3.5 (2.1%)	7.2 (3.4%)	6.1 (2.7%)	—

Four broad themes cut across all patient groups: barriers to nutrition, prescription issues with inappropriate or incomplete, lack of access to registered dietitians, and strategies for coping. Barriers caught affordability challenges, food insecurity, and physical constraints from illness. Prescription issues pointed out the incompatibility between medical guidance and realities on the ground. The absence of dietitian support arose prominently, as a majority of the participants depended on unqualified sources or general guidance. Coping strategies demonstrated resilience, where patients used such descriptions as dependence on family support, native remedies, or meal modification. Quotations given by the participants enhance the understanding of each theme (Table 2).

Table 2: Photovoice Data Thematic Analysis

Themes	Description	Illustrative Quote
Barriers to Nutrition	Treatment side effects, financial constraints, and limited food variety.	"Fresh fruits and vegetables are too expensive. I usually eat bread and lentils." (RA, female, 42)
Prescription Challenges	Unclear, vague, or impractical dietary instructions and advice.	"The doctor wrote 'avoid sugar' but didn't tell me what I could eat instead." (Diabetes, male, 50)
Lack of Dietitian Support	Absence of professional nutrition counseling, reliance on informal sources.	"In all my visits, I never met a dietitian." (RA, female, 39)
Coping Strategies	Family support, food substitutions, recipe modifications.	"I cannot afford meat every day, so I make lentil soup with extra vegetables." (Cancer, female, 47)

Findings show the interrelated themes that were derived from the photovoice study. Some central challenges were barriers to proper nutrition (e.g., affordability, access, and illness-related restrictions), improper or incomplete prescriptions, and inaccessibility to registered dietitians. These challenges intersected and supported each other, resulting in suboptimal eating habits. In spite of these limitations, patients explained coping mechanisms like family support, use of native remedies, and meal modification within financial constraints. The visual network also illustrates how these themes were connected and influenced patients' everyday nutrition experiences (Figure 1).
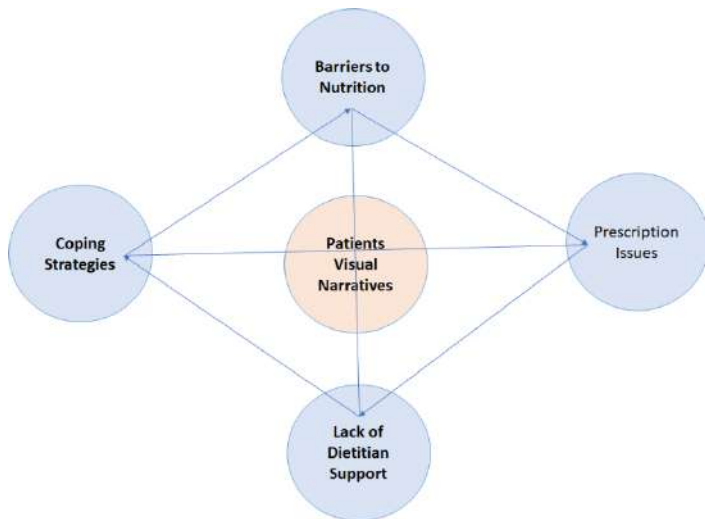
Figure 1: Thematic Network of Nutrition-Related Challenges and Coping Mechanisms among Cancer, Rheumatoid Arthritis, and Diabetes Patients (n=24)

Analysis of the photovoice stories and focus group discussions yielded four major themes: (1) Barriers to Optimal Nutrition, (2) Misdirected or Inadequate Prescription Practices, (3) Inadequate Access to Registered Dietitians, and (4) Patient Coping Strategies and Patient Advocacy. Theme 1: Obstacles to Ideal Nutrition: The patients have frequent exposure to limited and monotonous food, bare shelves, or inexpensive processed food. Such photos depicted economic hardships, adverse effects of treatment, and hunger. An illustration of this is a patient with cancer who said: "There are times when I can drink only tea and a biscuit; the chemotherapy makes everything taste of metal. One more diabetes patient photographed a shelf of white bread and sugar, and wrote: I understand that it is not good for me, but this is all I can afford most of the weeks. Theme 2: Improper or Lack of Proper Prescription Procedures: A few of the participants mentioned confusion about nutrition prescriptions that they had received at the hands of the general practitioners or non-specialist physicians. The scribbled notes and pictures of the generic supplements revealed a lack of customized dieting. One of the rheumatoid arthritis victims said that the doctor told him to eat more protein, but not how. I came out of the clinic even more confused. There were certain inconsistencies between what was written online and what had been prescribed: I was advised not to consume dairy, and another nurse appeared and mentioned that milk is fine. I don't know whom to trust." Theme 3: Inaccessibility to Registered Dietitians: Patients continued to make repeat photographs of empty diet offices in hospitals or referral slips with the term pending engraved on them. This imagery blankness highlighted structural deficits in nutrition. One of the patients with diabetes, in summary: I

have never seen a dietitian in my hospital, only the doctor. Food is the major problem that I encounter. One of the participants said: They prescribed me insulin but did not tell me what to eat in relation to this. A dietician would have assisted in creating a difference. Theme 4: Resilience and Patient Advocacy: Despite the adversity, the patients were creative and flexible. Coping mechanisms were depicted in scenes of vegetable gardens, meals at the table with families, and self-help strategies of preparing meals. One cancer patient stated: When the hospital could not give me an opportunity, I formed a WhatsApp group consisting of other patients, and we share recipes we could actually afford. Similarly, an RA patient has described: I plant spinach in pots. It is cheap, fresh, and is something that I can do during bad pain days.

DISCUSSION

This photovoice research investigated patients with cancer, RA, and diabetes's lived experiences of nutritional concerns, and four superordinate themes were identified: barriers to proper nutrition, problems with inappropriately or inadequately prescribed treatments, inaccessibility of registered dietitians, and strategies to cope. The results built on existing research to present visual and narrative data from the patients themselves, noting that nutritional management in chronic disease was influenced as much by economic, social, and system limitations as by medical advice. Additionally, longer illness duration independently hindered adequate nutrition by contributing to financial strain, appetite loss, and fatigue that limited dietary adherence. Throughout all three groups of patients, barriers to proper nutrition were foremost. Respondents often captured images of bare fridges in kitchens or small servings, which they duplicated their comments on cost and lack of variety in food. These results were in line with other reports that food insecurity is very common among the chronically ill population whose dietary restrictions are worsened by the economic burden of disease [12]. Sixty-six-point seven percent of our sample had a monthly household income less than PKR 30,000 and this was directly correlated with the inability to adhere to dietary instructions. One of them stated that no matter what the doctor may recommend me to eat more fruits, how can I purchase them daily? These voices pointed out that nutritional recommendation that does not keep economic facts in consideration is always impractical [14]. Second, prescription issues emerged as one of the key challenges. Some patients also reported that diet instructions were either not provided in their check-up sessions or were not clear and as such. Unused prescription images with comments that the diet advice was only a leaflet, not specific, were indicative of dissatisfaction. This resonated with existing literature, which quotes that chronic patients

are likely to be prescribed very specific or general nutritional plans, which leads to low adherence and misunderstanding [15]. The results stressed the necessity to offer dietary suggestions on a case-by-case basis and customized recommendations [16]. Third, the inefficiency of registered dietitians in the normal care was also mentioned in an acute way. Patients had noted dietary advice as the response of physicians or nurses, who confessed few facts on nutrition. One of the interviewees says that doctors consider medicine, however, no one informs me what to plan in the meals. This is in accordance with the results that incorporation of dietitians into the oncology, rheumatology and diabetes care teams enhances patient outcomes [17]. Insufficiency of professional nutrition education in the surrounding environment shows a failure in the system in respect of managing chronic illnesses [18]. Patients had innovative coping mechanisms in the presence of the barriers. There was resiliency in images of family-cooked meals, sharing in cooking, and traditional medicine. Some of them were found to modify recipes to suit their healthier budgets. Some employed peer recommendations or local community food practices. These processes were a reflection of outcomes in similar cases when patients cross structural and informational obstacles through the use of social networks and cultural information [19]. However, these interventions were normally insufficient to achieve optimal dietary goals. In general, the presented outcomes demonstrated the necessity of implementing a multi-dimensional solution to nutrition in patients with chronic illnesses. At the patient level, patient nutrition education should be both functional and culturally sensitive [20]. At the system level, it should be ensured that registered dietitians are included in interdisciplinary teams. At the policy level, subsidies or food stamps may help to reduce economic barriers. It is worth noting that the photovoice approach provided a voice to patients and developed the visual storytelling, which could have possibly become powerful tools for promoting a change in the health system. There were some limitations of this research. The size of the sample was limited and was in a single setting, so generalizability was an issue. This might have created bias in selection, as the patients may have chosen to highlight certain foods or difficulties using self-reported photographs and accounts. Nonetheless, the photovoice technique offered some advantage in narrating lived lives that would be readily missed in quantitative questionnaires.

CONCLUSIONS

In this research, it has been concluded that cancer patients, RA patients, and diabetic patients all had overlapping nutritional problems, which were related to socioeconomic, medical, and systemic restrictions. The solutions to these difficulties will include the integration of professional nutrition counseling into routine care, improvement of prescription policies, and affordability of nutrition interventions, as well as their accessibility. With patient voices at the heart, future programs will be more focused on the lived experiences and aspirations of the hardest hit groups.

Authors Contribution

Conceptualization: IAB
Methodology: IAB
Formal analysis: IAB, AM
Writing and drafting: IAB, AM
Review and editing: IAB, AM

All authors approved the final manuscript and take responsibility for the integrity of the work.

Conflicts of Interest

All the authors declare no conflict of interest.

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REFERENCES

[1] Li R, Yuan X, Ou Y. Global Burden of Rheumatoid Arthritis among Adolescents and Young Adults Aged 10–24 Years: A Trend Analysis Study from 1990 to 2019. PLOS One. 2024 Apr; 19(4): e0302140. doi: 10.1371/journal.pone.0302140.

[2] Zhang Y and Hu J. Nutrition Challenges in Less Developed Regions: Innovative Solutions. In Healthy Food for Children. Singapore: Springer Nature Singapore. 2025 Aug: 189-223. doi: 10.1007/978-981-96-8512-7_7.

[3] Short E, Akers L, Callahan EA, Allen CC, Crespo-Bellido M, Deuman K *et al.* The Role of Registered Dietitian Nutritionists within Food Is Medicine: Current and Future Opportunities. Journal of the Academy of Nutrition and Dietetics. 2025 Mar; 25(8): 1075-1084. doi: 10.1016/j.jand.2025.03.004.

[4] Garutti M, Noto C, Pastò B, Cucciniello L, Alajmo M, Casirati A *et al.* Nutritional Management of Oncological Symptoms: A Comprehensive Review. Nutrients. 2023 Dec; 15(24): 5068. doi: 10.3390/nu15245068.

[5] Tański W, Wójciga J, Jankowska-Polańska B. Association Between Malnutrition and Quality of Life in Elderly Patients with Rheumatoid Arthritis. Nutrients. 2021 Apr; 13(4): 1259. doi: 10.3390/nu13041259.

[6] Ahmed SK, Mohammed RA, Nashwan AJ, Ibrahim RH, Abdalla AQ, Ameen BM *et al.* Using Thematic Analysis in Qualitative Research. Journal of Medicine, Surgery, and Public Health. 2025 Aug; 6: 100198. doi: 10.1016/j.glmedi.2025.100198.

[7] Petroni ML, Brodosi L, Marchignoli F, Sasdelli AS, Caraceni P, Marchesini G, Ravaioli F. Nutrition in Patients with Type 2 Diabetes: Present Knowledge and Remaining Challenges. Nutrients. 2021 Aug; 13(8): 2748. doi: 10.3390/nu13082748.

[8] Wang MY, Li J, Peng HY, Liu J, Huang KL, Li L *et al.* Patients with Different Types of Arthritis May be at Risk for Major Depression: Results from the National Health and Nutrition Examination Survey 2007–2018. Annals of Palliative Medicine. 2021 May; 10(5): 5280288-5288. doi: 10.21037/apm-21-279.

[9] Campbell RB, Larsen M, DiGiandomenico A, Davidson MA, Booth GL, Hwang SW *et al.* The Challenges of Managing Diabetes While Homeless: A Qualitative Study Using Photovoice Methodology. Cmaj. 2021 Jul; 193(27): E1034-41. doi: 10.1503/cmaj.202537.

[10] Donnelly S, Wilson AG, Mannan H, Dix C, Whitehill L, Kroll T. (In) Visible Illness: A Photovoice Study of the Lived Experience of Self-Managing Rheumatoid Arthritis. Plos One. 2021 Mar; 16(3): e0248151. doi: 10.1371/journal.pone.0248151.

[11] Anderson K, Elder-Robinson E, Howard K, Garvey G. A Systematic Methods Review of Photovoice Research with Indigenous Young People. International Journal of Qualitative Methods. 2023 Apr; 22: 16094069231172076. doi: 10.1177/16094069231172076.

[12] Byrne D. A Worked Example of Braun and Clarke's Approach to Reflexive Thematic Analysis. Quality and Quantity. 2022 Jun; 56(3): 1391-412. doi: 10.1007/s11135-021-01182-y.

[13] Kumar M, Finik J, Gany F. Assessing Essential Needs Expressed by Breast and Gynecological Cancer Patients with Food Insecurity. Journal of Hunger and Environmental Nutrition. 2025 Nov; 20(6): 1666-76. doi: 10.1080/19320248.2025.2551881.

[14] Hess JM, Comeau ME, Scheett AJ, Bodensteiner A, Levine AS. Using Less Processed Food to Mimic a Standard American Diet Does Not Improve Nutrient Value and May Result in A Shorter Shelf Life at A Higher Financial Cost. Current Developments in Nutrition. 2024 Nov; 8(11): 104471. doi: 10.1016/j.cdnut.2024.104471.

[15] Sheikh JA, Farooq S, Nazmeen S, Yasin G. The Proliferation of Medical Clinics in Pakistani Street and Health Fragmentation: A Case Study. Asian Bioethics Review. 2025 Apr: 1-20. doi: 10.1007/s41649-024-00328-y.

[16] Bhandari B, Basyal B, Sarao MS, Nookala V, Thein Y, Nookala VK. Prevalence of Cancer in Rheumatoid Arthritis: Epidemiological Study Based on the National Health and Nutrition Examination Survey (NHANES). Cureus. 2020 Apr; 12(4). doi: 10.7759/cureus.7870.

[17] Verga GI, Baltă AA, Ciortea DA, Petrea CL, Șerban M, Matei MN *et al.* Healthcare Interventions in the Management of Rheumatic Diseases: A Narrative Analysis of Effectiveness and Emerging Strategies. In Healthcare. 2025 Jul; 13(14): 1691. doi: 10.3390/healthcare13141691.

[18] Saeed SA and Masters RM. Disparities in Health Care and the Digital Divide. Current Psychiatry Reports. 2021 Sep; 23(9): 61. doi: 10.1007/s11920-021-01274-4.

[19] Cutolo M and Nikiphorou E. Nutrition and Diet in Rheumatoid Arthritis. Nutrients. 2022 Feb; 14(4): 888. doi: 10.3390/nu14040888.

[20] Nguyen HD, Oh H, Kim MS. Higher Intakes of Nutrients Are Linked with A Lower Risk of Cardiovascular Diseases, Type 2 Diabetes Mellitus, Arthritis, and Depression among Korean Adults. Nutrition Research. 2022 Apr; 100: 19-32. doi: 10.1016/j.nutres.2021.11.003.