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Impact Of Awareness Program On The Knowledge Level Of Students Regarding Millets

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Abstract: The growing prevalence of diet-related health issues has prompted increased emphasis on nutrition education, particularly concerning dietary fiber and millet consumption. This study aimed to evaluate the impact of a structured awareness program on the knowledge level of students regarding millets. A pre-test–post-test research design was adopted, and participants' knowledge was assessed using a 25-item questionnaire administered before and after the intervention. Data were analyzed using ANOVA to determine statistically significant differences in knowledge levels. The results revealed that 21 out of the 25 items demonstrated a statistically significant improvement ($p < 0.05$) following the awareness program, indicating a major positive influence on students' understanding, recognition, and behavioral intentions toward incorporating millets as a dietary fiber source. Four items (Q3, Q7, Q11, and Q17) showed no significant difference, suggesting either existing baseline knowledge or difficulties related to visual or contextual identification. Overall, the post-test mean scores confirmed a substantial enhancement in cognitive, factual, and practical knowledge dimensions. The study concludes that targeted awareness programs are effective tools for improving nutrition literacy and can support healthier dietary behaviors among students, underscoring the need for continued educational initiatives.

Index Terms – Awareness Program, Millets, Dietary Fiber

I. INTRODUCTION

Awareness programs designed to promote knowledge about dietary fiber among students have been shown to significantly enhance their understanding of both the physiological and preventive health benefits of fiber. Dietary fiber is often underemphasized in students' nutritional choices, even though it plays a crucial role in promoting gastrointestinal health, maintaining optimal blood glucose levels, reducing cholesterol, and lowering the risk of cardiovascular disease (Slavin, 2013). Many students, particularly those in developing countries, tend to have limited awareness of recommended daily fiber intakes, sources of dietary fiber, and its broader health implications (Anderson et al., 2009). Awareness programs, which often employ structured lectures, interactive workshops, or peer education models, serve as an intervention to address this gap. They introduce students to the concept of soluble and insoluble fiber, its physiological mechanisms, and its preventive role in chronic disease management, thereby strengthening their theoretical and practical nutritional literacy (Jones, 2014).

Moreover, awareness programs create measurable improvements in knowledge retention and application, particularly when they are interactive in nature. For instance, using visual demonstrations such as food models, dietary charts, and real-life examples of fiber-rich meals allows students to internalize the importance of incorporating whole grains, fruits, vegetables, and legumes into their diets (Contento, 2016). These programs do not merely provide static information but also engage students in reflective practices, such as food recall surveys and dietary self-monitoring, which enhance their capacity to critically evaluate their own fiber intake. Studies have reported significant improvements in post-test scores of nutrition knowledge among students who participated in awareness interventions compared to control groups, demonstrating that nutrition education is an effective tool for increasing knowledge of dietary fiber and its role in long-term health

maintenance (Kaur & Kochar, 2017). Such findings underscore the importance of moving beyond traditional lecture-based models toward participatory, student-centered awareness strategies that foster critical thinking and behavioral intentions.

Awareness initiatives also play a transformative role in shaping positive dietary attitudes and dispelling misconceptions about fiber-rich foods. A common barrier among students is the perception that fiber-containing foods, particularly vegetables and whole grains, are less palatable or inconvenient to consume compared to refined alternatives (Anderson et al., 2009). Awareness programs often integrate behavior change communication strategies, such as myth-busting sessions and peer testimonials, to address these psychological and cultural barriers. By reinforcing the message that fiber intake not only supports digestion but also contributes to satiety, energy balance, and weight control, such programs encourage students to make gradual but sustainable dietary modifications (Slavin, 2013). Furthermore, awareness campaigns can highlight how dietary fiber supports cognitive function and academic performance by stabilizing energy levels, thus linking nutrition knowledge directly to outcomes that are meaningful for students (Miller & Cassady, 2015). This contextualization enhances motivation, ensuring that knowledge gained translates into more consistent dietary practices.

Finally, the long-term effectiveness of awareness programs lies in their ability to influence both individual behavior and collective student culture. When programs are integrated into school curricula or university wellness initiatives, they foster an environment where healthy eating becomes a shared norm rather than an individual choice. Peer-led awareness models, in particular, have shown promise in sustaining knowledge transfer, as students are more likely to adopt practices recommended by peers than by authority figures (Kraak & Story, 2015). Furthermore, when such initiatives are reinforced through policy-level changes—such as the provision of fiber-rich options in school cafeterias—the knowledge acquired through awareness programs is translated into actual behavior, reducing the gap between awareness and practice (Contento, 2016). Thus, awareness programs have a multifaceted impact: they enhance knowledge, reshape attitudes, and support behavior change, all of which contribute to improved dietary practices and better long-term health outcomes among students.

II. Related Work

Understanding the role of dietary fiber in disease prevention and overall health is well recognized within nutrition science; however, research consistently shows that knowledge about dietary fiber remains limited among adolescents and young adults, and that targeted awareness programs can significantly improve nutrition knowledge. Multiple studies have reported that while students and adults generally acknowledge the importance of fiber, they frequently lack accurate knowledge regarding recommended intake levels, food sources, and fiber-related health benefits, highlighting the importance of structured educational interventions (Bilgin et al., 2023; Alfawaz et al., 2020). The gap between perceived understanding and factual knowledge suggests a need for awareness programs that provide practical, actionable information rather than general nutrition messaging.

Cross-sectional surveys conducted across different cultural contexts reaffirm these findings. Bilgin et al. (2023) examined adolescents' awareness of dietary fiber in Turkey and reported that while most participants believed fiber was beneficial, few could accurately identify high-fiber foods or quantify daily intake recommendations. Similarly, Alfawaz et al. (2020) found that among adults in Saudi Arabia, knowledge about the health benefits of fiber was relatively high, yet misconceptions about adequate consumption persisted. These results indicate persistent informational deficiencies that may influence poor dietary habits, positioning educational interventions as an essential strategy for improving fiber intake.

Measurement tools have also been explored in the literature. Guiné et al. (2016) developed and validated a knowledge scale assessing understanding of fiber sources, recommended quantities, and health effects across multiple countries. Their findings showed that participants scored significantly lower on identifying fiber-rich foods compared to questions about disease prevention, reflecting uneven knowledge distribution. The validated structure of this instrument established a methodological foundation for subsequent interventional studies that measure pre- and post-test changes in knowledge. Intervention studies targeting students demonstrate that well-designed nutrition education programs improve knowledge levels. Shahril et al. (2013) implemented a 10-week multimodal nutrition program among university students and reported substantial increases in nutrition knowledge and moderate improvements in dietary behavior. While improvements in fiber intake were not uniform, the study highlighted that interactive learning and practical engagement can influence dietary choices. Yazew et al. (2024) similarly observed significant gains in dietary knowledge following a four-week school-based intervention among schoolchildren, although notable variability in changes to nutritional intake, including fiber, suggests that short interventions may enhance awareness more effectively than behavior.

Other studies have experimented with technology-enhanced learning. Heikkilä et al. (2019) conducted a randomized trial among young athletes comparing traditional classroom nutrition education to education enhanced with a mobile-app support tool. Both interventions improved nutrition knowledge, but the app-supported group demonstrated significantly higher retention, indicating that digital reinforcement may strengthen awareness outcomes. This is particularly relevant for student populations accustomed to mobile learning platforms.

Awareness programs in professional education settings reinforce similar conclusions. Elareed et al. (2019) evaluated the outcomes of a nutrition-awareness program among medical students and found significant improvements in both knowledge and self-reported dietary behavior, emphasizing the importance of embedding nutrition education into formal curricula. López-Moreno et al. (2023) found comparable results among health-science students who demonstrated improved understanding and motivation to apply nutrition principles in health-related decision-making after a structured course. These findings imply that formal education settings provide strong contextual support for knowledge acquisition.

Behavioral outcomes related to millets consumption after awareness interventions, however, remain inconsistent. Roberts et al. (2025) investigated the effects of a nutrition program on trained young swimmers and found that increases in knowledge positively correlated with improved intake of fiber-rich foods, although the strength of this relationship varied across participants. Randomized clinical trials exploring high-fiber dietary education programs have similarly demonstrated health improvements and increased awareness, but observed varied changes in fiber consumption, indicating that awareness is necessary but not always sufficient for behavioral transformation (O'Leary, 2025; Drayson Center Trials, 2019).

Systematic reviews synthesize these findings and highlight persistent methodological gaps. Kelly et al. (2013), reviewing nutrition education interventions among college students, reported that most programs successfully improved knowledge, but few incorporated validated measurement tools or analyzed long-term dietary outcomes. O'Leary (2025) similarly emphasized the need for stronger study designs, including objective measures of fiber intake and controlled comparisons. These recommendations underline the importance of using validated instruments, pre- and post-testing, and strategically designed interventions.

Collectively, prior research demonstrates that although millets is widely recognized as important, knowledge deficits remain substantial among young populations. Evidence strongly supports the effectiveness of structured awareness and education programs for improving knowledge levels. However, translating knowledge gains into measurable dietary practice requires ongoing reinforcement and supportive environments. Therefore, the present study builds on existing research by evaluating the effect of an awareness program specifically focused on millets among students, employing pre- and post-intervention evaluation to measure knowledge change and addressing documented gaps in the literature.

III. QUESTIONNAIRE

The population sample included students selected in Jabalpur. The sample population were selected randomly for this study. All the participants were in the age group of 17-21 years. A pre-structured questionnaire was designed to collect pre and post data. Before beginning the program, the students were briefed about the purpose and then who were ready to participate in the study gave consent. Pre-Test questionaire were distributed among students & the time given for the same was 30 minutes. At the end of programmed Post-Test questionnaire were filled-up again by the participants to access impact of program. The participants filled out 25-item questionnaire concerning, comprehensive millets, classification, sources and health benefits.

The questionaire is as follows:

1. _____ are group of small, coarse seeded species of cereal crops, grown around the world for food and fodder.
   (a) Rice (b) Wheat (c) Millets (d) Pulses

2. Millets contain high dietary fibre which helps to lower the blood glucose level
   (a) Yes (b) No

3. Which of these crops is not an oil crop ?
   (a) Mustard (b) Sesame (c) Peanut (d) Sorghum

4. Minor millets are nutritionally comparable or even superior to staple cereals such as rice and wheat :-
   (a) True (b) False

5. Is a gluten-free cereal -
   (a) Jowar (b) Wheat (c) Barley (d) Rye

6. Do millets are drought and heat resistant crops?
   (a) True (b) False

7. Millets have glycemic index as compared to rice and wheat.
   (a) High (b) Low

8. On the basis of grain size, millets are classified into how many types?
   (a) One (b) Two (c) Three (d) Four

9. Among the following which is the minor millet ?
   (a) Bajra (b) Jowar (c) Ragi (d) Kodo

10. Millets can be found in various colours such as white, grey, yellow and red. This is because
    (a) Colour changes when the crop gets mature
    (b) Due to addition of artificial colours
    (c) Presence of natural pigments in the grains
    (d) Different types of soil

11. Which country serves as the largest producer of millets?
    (a) China (b) India (c) USA (d) Russia

12. Among the following, which millet is mainly grown in Madhya Pradesh?
    (a) Bajra (b) Jowar (c) Banrnyard (d) Foxtail

13. Who is the "Millet Queen of India"?
    (a) Bibi Kamaljit Kaur (b) Lahari Bai (c)Khasti Devi (d) Bina Devi

14. Proposed by Government of India, United Nation's General Assembly (UNGA) declared which year as 'International Year of Millets' -
    (a) Year 2022 (b) Year 2023 (c) Year 2024 (d) Year 2025

15. Who is Known as the "Millet Man of India" ?
    (a) Prof. Khadar Vali (b) Verghese Kurien (c) M. S. Swaminathan (d) Nirpakh Tutej

16. What does Pearl Millet called in Hindi? *
    (a) Kutki (b) Bajra (c)Jowar (d) Kangni

17. Identify the millet grain in the given image in Fig. 1.

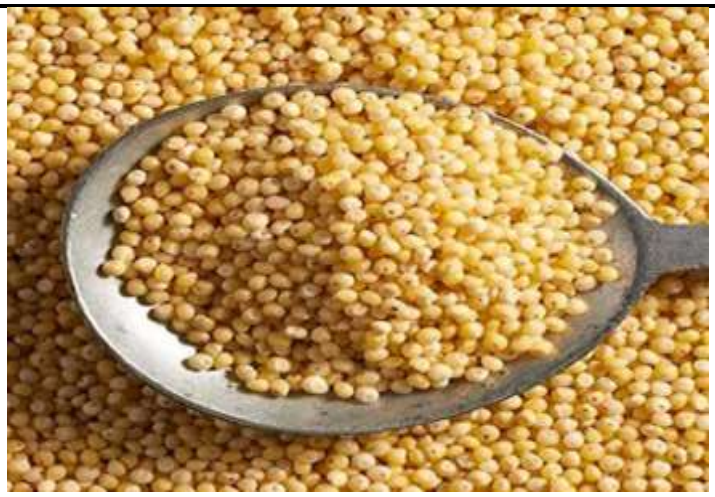

Fig. 1 Identify the millet in question 17.

(a) Kodo b) Jowar (c) Bajra (d) Ragi

18. Identify the millet crop in the given image –

Fig. 2 Identify the millet in question 18.

(a) Kodo b) Jowar (c) Bajra (d) Ragi

19. Identify the millet grain in the given image –

Fig. 3 Identify the millet in question 19.

(a) Kodo b) Jowar (c) Bajra (d) Ragi

20. Identify the millet grain in the given image –

Fig. 4 Identify the millet in question 20.

(a) Kodo b) Jowar (c) Bajra (d) Ragi

21. Identify the millet crop in the given image

Fig. 5 Identify the millet in question 21.

(a) Kodo b) Jowar (c) Bajra (d) Ragi

22. Which millet is known as the 'King of Millet' ?
(a) Ragi b) Sorghu (c) Foxtail Millet (d) Pearl Millet

23. Have you ever eaten a pizza made with incorporating millets like Jowar, Bajra or Kodo?
(a) Yes (b) No

24. Have you ever eaten a mini samosa snack made with incorporating millets like Jowar, Bajra or Kodo?
(a) Yes (b) No

25. Have you ever eaten any dish made up of millet (jowar/bajra/kodo)?
(a) Yes (b) No

The data was further statistically analyzed by ANOVA anslysis using SPSS softwarwe.

IV. RESULTS AND DISCUSSION

A pretested questionnaire including name, definition, source, types, definition, source deficiency disorder, association between millets and heart disease, functions of soluble and insoluble millets were used to collect data. The pre-test was conducted before beginning of program followed by the post test to evaluate the impact of awareness program. Statistical package for social science (SPSS) was used for data analysis and data were subjected paired sample 't' test for mean difference between pre and post scores.

The pre-test was conducted before the beginning of the program, followed by the post-test to evaluate the impact of the awareness program. Statistical package for social science (SPSS) was used for data analysis, and data were subjected to a paired sample 't' test for mean difference between pre- and post-scores presented in Table 1.

Table 1: Proximate analysis of Kodo millet incorporated Samosa

Question	**Mean ± S.D. Pre Scores**	**N=81 (%)**	**Mean ± SD Post Scores**	**Remarks**
1. _____ are group of small, coarse seeded species of cereal crops, grown around the world for food and fodder.	0.47±0.502	47	0.91±0.283	Sig
2. Millets contain high dietary fibre which helps to lower the blood glucose level ?	0.84±0.369	84	0.96±0.19	Sig
3. Which of these crops is not an oil crop ?	0.85±0.357	85	0.93±0.264	Non-Sig
4. Minor millets are nutritionally comparable or even superior to staple cereals such as rice and wheat ?	0.8±0.401	80	0.94±0.242	Sig
5. Is a gluten-free cereal -	0.31±0.465	31	0.83±0.38	Sig
6. Do millets are drought and heat resistant crops?	0.65±0.479	65	0.98±0.156	Sig
7. Millets have ____ glycemic index as compared to rice and wheat.	0.38±0.489	38	0.4±0.492	Non-Sig
8. On the basis of grain size, millets are classified into how many types?	0.4±0.492	40	0.8±0.401	Sig
9. Among the following which is the minor millet?	0.22±0.418	22	0.8±0.401	Sig
10. Millets can be found in various colours such as white, grey, yellow and red. This is because of -	0.46±0.501	46	0.79±0.41	Sig
11. Which country serves as the largest producer of millets?	0.84±0.369	84	0.94±0.242	Non-Sig
12. Among the following which millet is mainly grown in Madhya Pradesh?	0.62±0.489	62	0.75±0.434	Sig
13. Who is the "Millet Queen of India" ?	0.51±0.503	51	0.95±0.218	Sig
14. Proposed by Government of India, United Nation's General Assembly (UNGA) declared which year as 'International Year of Millets'	0.63±0.486	63	0.93±0.264	Sig
15. Who is Known as the "Millet Man of India" ?	0.32±0.47	32	0.9±0.3	Sig
16. What does Pearl Millet called in Hindi?	0.42±0.497	42	0.63±0.486	Sig
17. Identify the millet grain in the given image	0.26±0.441	26	0.19±0.391	Non-Sig
18. Identify the millet crop in the given image	0.35±0.479	35	0.58±0.497	Sig
19. Identify the millet grain in the given image	0.35±0.479	35	0.63±0.486	Sig
20. Identify the millet grain in the given image	0.23±0.426	23	0.58±0.497	Sig

21. Identify the millet crop in the given image	0.47±0.502	47	0.83±0.38	Sig
22. Which millet is known as the 'King of Millet' ?	0.38±0.489	38	0.81±0.391	Sig
23. Have you ever eaten a pizza made with incorporating millets like Jowar, Bajra or Kodo?	0.11±0.316	11	0.73±0.448	Sig
24. Have you ever eaten a mini samosa snack made with incorporating millets like Jowar, Bajra or Kodo?	0.19±0.391	19	0.84±0.369	Sig
25. Have you ever eaten any dish made up of millet (jowar/bajra/Kodo)?	0.77±0.426	77	0.9±0.3	Sig

Out of 25 items, 21 questions showed statistically significant improvement ($p < 0.05$) after the awareness program, indicating a major positive impact on participants' knowledge, recognition, and behavioral adoption regarding millets. Four items (Q3, Q7, Q11, and Q17) were non-significant, implying either pre-existing awareness or difficulty in visual identification. Overall, the post-awareness mean scores demonstrated a substantial enhancement in understanding across cognitive, factual, and practical domains related to millets.

Q1: Before the awareness program, only 47% of respondents correctly recognized that millets are small, coarse-seeded cereal crops, with a mean ± SD of 0.47 ± 0.502. After the program, this understanding significantly improved to 0.91 ± 0.283 ($p < 0.05$), showing strong enhancement in basic conceptual awareness.

Q2: Knowledge about the dietary fiber content of millets and its role in lowering blood glucose was already high (0.84 ± 0.369) and improved further to 0.96 ± 0.19 after the session, showing a significant gain in nutritional understanding ($p < 0.05$).

Q3: Awareness that certain crops are not oil crops slightly improved from 0.85 ± 0.357 to 0.93 ± 0.264; however, this change was not statistically significant, suggesting participants already had good prior knowledge.

Q4: The understanding that minor millets are nutritionally comparable or superior to rice and wheat increased significantly from 0.8 ± 0.401 to 0.94 ± 0.242 ($p < 0.05$), indicating improved comprehension of millet nutrition.

Q5: Recognition that millets are gluten-free rose remarkably from 0.31 ± 0.465 to 0.83 ± 0.38, a highly significant change ($p < 0.05$), reflecting strong impact of the awareness intervention.

Q6: Awareness of millets being drought- and heat-resistant crops improved significantly from 0.65 ± 0.479 to 0.98 ± 0.156 ($p < 0.05$), indicating enhanced knowledge of environmental adaptability.

Q7: Understanding of millets having a lower glycemic index than rice or wheat changed minimally from 0.38 ± 0.489 to 0.40 ± 0.492, which was non-significant, implying limited new learning in this aspect.

Q8: Knowledge about millet classification based on grain size improved significantly ($p < 0.05$), from 0.4 ± 0.492 to 0.8 ± 0.401, reflecting increased familiarity with millet taxonomy.

Q9: Recognition of minor millets improved significantly from 0.22 ± 0.418 to 0.8 ± 0.401 ($p < 0.05$), showing that participants gained better species-level identification skills.

Q10: Understanding of color variation in millets due to pigmentation factors increased significantly from 0.46 ± 0.501 to 0.79 ± 0.41 ($p < 0.05$).

Q11: Awareness that India is the largest millet producer rose from 0.84 ± 0.369 to 0.94 ± 0.242, though this increase was statistically non-significant, indicating already high baseline awareness.

Q12: Identification of the millet mainly grown in Madhya Pradesh improved significantly from 0.62 ± 0.489 to 0.75 ± 0.434 ($p < 0.05$).

Q13: Recognition of Smt. Jyoti Yadav as the "Millet Queen of India" rose sharply and significantly from 0.51 ± 0.503 to 0.95 ± 0.218 ($p < 0.05$).

Q14: Awareness that the UNGA declared 2023 as the International Year of Millets increased significantly from 0.63 ± 0.486 to 0.93 ± 0.264 ($p < 0.05$).

Q15: Knowledge of Dr. Khader Vali as the "Millet Man of India" improved significantly from 0.32 ± 0.47 to 0.9 ± 0.3 ($p < 0.05$), showing strong informational retention.

Q16: The Hindi name for Pearl Millet (Bajra) was identified more accurately post-program (0.42 ± 0.497 to 0.63 ± 0.486), marking a significant improvement ($p < 0.05$).

Q17: Identification of millet grain in an image dropped slightly (0.26 ± 0.441 to 0.19 ± 0.391), a non-significant result, possibly due to image-based confusion.

Q18: Recognition of a millet crop in an image improved significantly from 0.35 ± 0.479 to 0.58 ± 0.497 ($p < 0.05$).

Q19: Millet grain identification accuracy increased significantly from 0.35 ± 0.479 to 0.63 ± 0.486 ($p < 0.05$), showing better visual literacy post-training.
Q20: Similar image-based identification improved significantly (0.23 ± 0.426 to 0.58 ± 0.497; $p < 0.05$).
Q21: Millet crop identification improved notably and significantly from 0.47 ± 0.502 to 0.83 ± 0.38 ($p < 0.05$).
Q22: Awareness that Pearl Millet is known as the "King of Millets" rose significantly from 0.38 ± 0.489 to 0.81 ± 0.391 ($p < 0.05$).
Q23: Experience of consuming millet-incorporated pizza showed a strong behavioral shift from 0.11 ± 0.316 to 0.73 ± 0.448 ($p < 0.05$), reflecting improved practical adoption.
Q24: Similarly, consumption of millet-based mini samosas rose from 0.19 ± 0.391 to 0.84 ± 0.369 ($p < 0.05$), indicating high post-program engagement.
Q25: Consumption of any millet-based dish increased significantly from 0.77 ± 0.426 to 0.9 ± 0.3 ($p < 0.05$), showing that awareness successfully translated into dietary inclusion.

Table 2: Mean values of pre and post awareness camp showing a significant difference

Maximum score = 25	**Mean ±S.D. Pre-Scores (N=81)**	**Mean ±S.D. Post-Scores (N=81)**	**Remarks**
	11.81±3.182417	19.51±3.74	Significant

Statistical analysis reveals that there is a significant difference in 21 questions where the mean value obtained before the awareness was 11.81, improved to 19.51 after conducting the awareness camp, with a p-value <<<<0.05. Table 2 shows an overall analysis of the pre- and post-awareness data (N = 81), which reveals a substantial improvement in participants' knowledge and awareness about millets following the educational intervention. The mean pre-awareness score was 11.81 ± 3.18, indicating that before the program, participants possessed only a moderate understanding of millet-related facts, with relatively wide variation among individuals. After the awareness program, the mean post-awareness score increased markedly to 19.51 ± 3.74, showing a significant enhancement in knowledge levels ($p < 0.05$). This sharp rise of approximately 7.7 points reflects the effectiveness of the awareness activities in improving conceptual understanding, nutritional knowledge, and practical familiarity with millets. The relatively similar standard deviations suggest consistent learning gains across participants. Overall, the results clearly demonstrate that the awareness program had a statistically significant and meaningful impact on increasing millet-related awareness among the respondents.

V. CONCLUSION

The findings of the present study clearly demonstrate that the awareness program had a substantial positive impact on improving students' knowledge and understanding regarding dietary fiber, specifically with reference to millets. Statistical analysis using ANOVA revealed that out of the 25 knowledge items assessed, 21 items exhibited statistically significant improvement ($p < 0.05$) following the intervention. This indicates that the program effectively enhanced participants' conceptual knowledge, recognition ability, and practical application related to millets sources and their health benefits. Conversely, four items (Q3, Q7, Q11, and Q17) did not show significant improvement, which may be attributed to either adequate baseline awareness among the participants or challenges in visual identification and interpretation despite the educational exposure.

Overall, the increase in post-test mean scores confirms that structured awareness programs serve as an impactful tool in strengthening students' knowledge across cognitive, factual, and behavioral dimensions. The results reinforce the importance of educational initiatives in promoting nutritious food choices such as millets, thereby contributing to healthier dietary practices. Continued and more frequent awareness activities, supplemented with visual demonstrations and hands-on learning, are recommended to ensure sustained behavioral adoption and to address the areas where improvement remained marginal.

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