

Knowledge, Attitudes, and Practices of Healthcare Professionals Toward Malnutrition Management: A Cross-Sectional Study from Al-Hawija General Hospital and Related Health Sectors, Kirkuk, Iraq

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ABSTRACT

Background: Hospital malnutrition affects 20–50% of inpatients globally, contributing to increased morbidity, prolonged stay, and mortality. Healthcare professionals (HCPs) are frontline in its detection and management, yet their knowledge, attitudes, and practices (KAP) remain largely undocumented in the Al-Hawija district, Kirkuk, Iraq. **Objective:** To assess the KAP of HCPs toward malnutrition management in Al-Hawija General Hospital and affiliated health facilities. **Methods:** A descriptive cross-sectional survey (N=126) used a structured Arabic questionnaire covering demographics, knowledge (13 items: Yes/No/Don't know), attitudes (10 Likert items, 1–5), practices (10 frequency items, 1–5), and open-ended barriers/recommendations. **Results:** Pharmacists (40.5%) and nurses (34.1%) predominated; only 17.5% had received clinical nutrition training. Mean knowledge score was $8.12 \pm 2.31/13$ (62.5%); mean attitude score $3.66 \pm 0.55/5$ (73.2%); mean practice score $3.09 \pm 1.10/5$ (51.5%), revealing a significant KAP gradient (Attitudes > Knowledge > Practices). Critical knowledge gaps included unfamiliarity with MUST/NRS-2002 tools (70.6% 'Don't know'). Trained HCPs scored significantly higher on practices (3.67 vs. 2.96). Primary reported barriers were the absence of dietitians, insufficient training, and lack of standardised protocols. **Conclusions:** HCPs demonstrate positive attitudes but suboptimal knowledge and practices. Mandatory training, multidisciplinary nutrition teams, and standardised protocols are urgently needed.

Keywords: Malnutrition, Hospital Nutrition, Nutritional Screening, Knowledge-Attitude-Practice, Healthcare.

Article Information

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INTRODUCTION

Hospitals face issues regarding malnutrition as a worldwide public health problem, with 20 to 50 percent of inpatients experiencing malnutrition depending on their setting and population (Cederholm et al., 2019). It is associated with delayed wound healing, immunological suppression, heightened risk of infection, formation of pressure ulcers, extended hospital stays, increased rates of readmissions, and increased mortality (Lim et al., 2012; White et al., 2012). Malnourished patients are approximately 2.5 times more likely to develop healthcare-associated infections and incur treatment costs 15–20% higher than adequately nourished counterparts (Bischoff et al., 2020). In underdeveloped healthcare systems, positive

professional values are not enough for the establishment of desired behaviour changes. Most alarming individual result was the almost complete lack of awareness regarding MUST and NRS-2002 screening tools, as only 27.0% knew them (K3). Both tools are internationally recommended as the priority tools for bed-side nutrition risk assessment (Kondrup et al., 2003; Stratton & Elia, 2007). Healthcare professionals (HCPs) physicians, nurses, pharmacists, and allied health workers constitute the frontline of malnutrition detection and management. According to ESPEN, validated screening instruments like MUST and NRS-2002 should be used for admission screening during the first 24 to 48 hours

(Weimann et al., 2021). Despite this, KAP studies from multiple regions consistently report a 'knowledge–practice gap' wherein HCPs hold adequate knowledge and positive attitudes yet deliver suboptimal nutritional care due to systemic and educational barriers (Eglseer et al., 2017; Tappenden et al., 2013). In Iraq, the healthcare system has endured extraordinary disruption. The 2014–2017 occupation of Kirkuk governorate and its districts including Al-Hawija by Da'esh resulted in widespread destruction of hospitals, supply chains, and clinical infrastructure (United Nations Development Programme Iraq [UNDP Iraq], 2017). Post-conflict reconstruction has prioritised emergency and surgical services, leaving clinical nutrition as a persistently underfunded domain. There is a lack of specialised dietitians in district level facilities, nutrition support teams are almost non-existent and there is no institutionalisation of standardised screening protocols. The 2023 annual health plan for Al-Hawija district identified early malnutrition identification as a priority objective (Werner et al., 2023). yet no quantitative KAP baseline existed prior to this investigation. This study addresses this gap by carrying out an extensive KAP evaluation of HCPs at Al-Hawija General Hospital and affiliated health facilities in Al-Hawija and Al-Abbasi districts, Kirkuk, Iraq.

METHODS AND MATERIAL

Research Design and Environment

A descriptive quantitative cross-sectional survey was performed. The study was conducted in governmental, private and academic health facilities in Al-Hawija and Al-Abbasi districts of Kirkuk governorate, Iraq. The largest is General Hospital in Al-Hawija secondary care facility in the district offering inpatient medical, surgical, paediatric, emergency and ICU

Participants and Sampling

Al-Hawija, Iraq All HCPs with direct or indirect patient contact during the data collection period were eligible. The professional categories included pharmacists, nurses, physicians, laboratory technicians and other allied health personnel. Convenience sampling

was used; 200 Questionnaires were distributed via ward coordinators (paper) and Google Forms (digital), and 126 valid complete responses were obtained and analysed.

Data Gathering Tool

A self-administered, structured survey comprised five sections: (A) sociodemographics (7 items); (B) knowledge (13 Yes/No/Don't know items on malnutrition consequences, screening tools, and management principles); (C) attitudes (10 five-point Likert items: 1=Strongly Disagree to 5=Strongly Agree); (D) practices (10 frequency items: 1=Never to 5=Always); (E) two open-ended questions on barriers and recommendations. This method was used according to the established KAP frameworks (Launiala, 2009).

Outcome Variables

Composite scores were computed as follows: (1) Knowledge Score: number of correct answers out of 13 (maximum=13); (2) Attitudes Score: mean of 10 Likert items (maximum=5.0); (3) Practices Score: mean of 10 frequency items (maximum=5.0). Scores were also standardised to 0–100% for cross-domain comparison.

Statistical Analysis

Data were analyzed in Python 3.12 (Pandas, NumPy). Means, standard deviations, frequencies and percentages were used as descriptive statistics. Subgroup comparisons (professional category, gender, training status) were made by Mann–Whitney U test (two groups) and Kruskal–Wallis H test (three groups). Significance was defined at $p < 0.05$.

RESULTS

Sociodemographic Characteristics

A total of 126 HCPs responded to the survey. Table 1 presents sociodemographic characteristics. The sample was predominantly male (71.4%, $n=90$) and young, with 72.2% ($n=91$) aged 25–34 years. The largest professional group was pharmacists (40.5%, $n=51$), followed by nurses (34.1%, $n=43$). Most of the respondents had 1–5 years' experience 57.1% ($n=72$) and 85.7% ($n=108$) were working in governmental facilities. Only 17.5% ($n=22$) had received any continuing education in clinical nutrition (of major clinical importance).

Table 1. Study Participants' Sociodemographic Features (N=126)

Variable	Category	n	%
Gender	Male	90	71.4
	Female	36	28.6
Age group	<25 years	11	8.7
	25–34 years	91	72.2
	35–44 years	21	16.7
	≥45 years	3	2.4
Profession	Pharmacist	51	40.5
	Nurse	43	34.1
	Other	32	25.4
Experience	<1 year	4	3.2
	1–5 years	72	57.1
	6–10 years	32	25.4
	>10 years	18	14.3
Institution	Government	108	85.7
	Private	14	11.1
	Academic	4	3.2
Received training	Yes	22	17.5
	No	104	82.5

Comparison of Composite domain and KAP gradient

The domain scores, standardized to 0-100%, reveal a clear gradient, with Attitudes (73.2%) >

Knowledge (62.5%) > Practices (51.5%), and a gap of 21.7 percentage points between attitudes and practices (Figure 1).

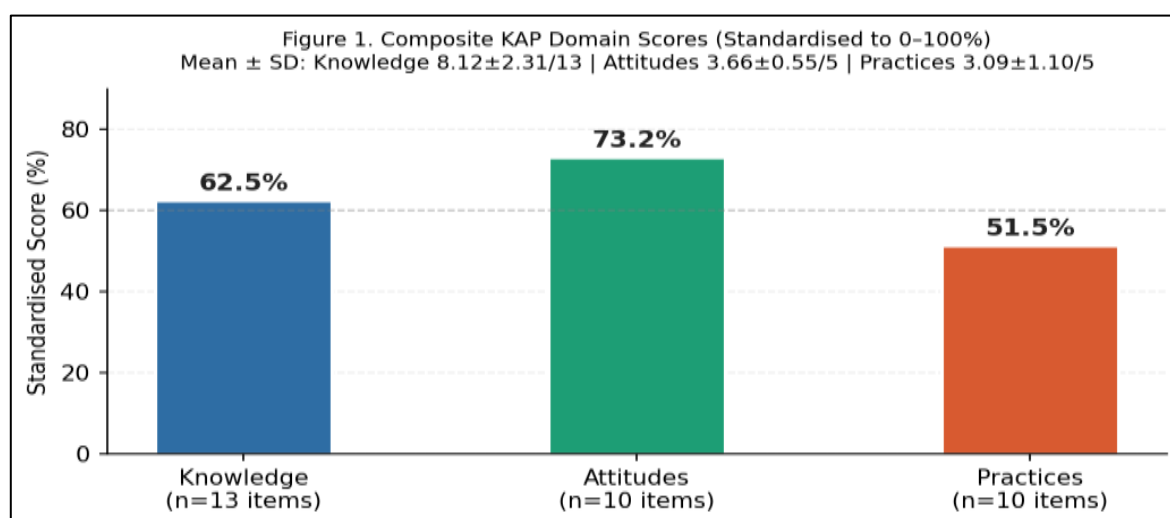


Figure 1. Composite KAP Domain Scores Standardised to 0–100% (N=126). The KAP gradient (Attitudes > Knowledge > Practices) and the 21.7-point attitude–practice gap are clearly visible. Horizontal dashed line at 60% represents a provisional competency reference.

Domain Knowledge

Table 2 provides the answers to the knowledge items. The average total knowledge score was 8.12±2.31/13 (62.5%). Only 3 respondents (2.4%) had a perfect score. Correct-response rates were high for K6 (96.0%), K8 (93.7%), K4 (91.3%), and K13 (84.1%). The

largest gap was K3 (MUST/NRS-2002 familiarity): 27.0% answered correctly, 70.6% answered 'Don't know'. Misconceptions were seen for K5, where 58.7% agreed the nursing role is 'very limited' (reversed item; correct = No). Figure 2 presents the full distribution of responses across all 13 items.

Table 2. Knowledge Item Responses — Percentage Distribution and Correct-Response Rates (N=126)

Item	Statement (abbreviated)	Yes %	No %	DK %	Correct Ans.	% Correct
K1	Increases LOS & complications	79.4	3.2	17.5	Yes	79.4
K2	Screen within 24–48 h	71.4	7.9	20.6	Yes	71.4
K3	MUST & NRS-2002 tools	27.0	2.4	70.6	Yes	27.0
K4	Impairs wound healing & immunity	91.3	1.6	7.1	Yes	91.3
K5	Nursing role is limited (R)	58.7	26.2	15.1	No	26.2
K6	Weakens immunity & raises infection risk	96.0	1.6	2.4	Yes	96.0
K7	Wt loss >5%/month = key sign	64.3	20.6	15.1	Yes	64.3
K8	Involve dietitian immediately	93.7	0.8	5.6	Yes	93.7
K9	TPN for non-functional GI tract	61.9	19.0	19.0	Yes	61.9
K10	Oral supplements are effective	59.5	18.3	22.2	Yes	59.5
K11	Visual inspection alone sufficient (R)	7.9	77.8	14.3	No	77.8
K12	BMI is the only tool needed (R)	16.7	51.6	31.7	No	51.6
K13	Nutrition plan reviewed regularly	84.1	5.6	10.3	Yes	84.1

DK = Don't Know; R = Reversed item (correct answer = No); LOS = Length of Stay; TPN = Total Parenteral Nutrition; GI = Gastrointestinal; Wt = weight.

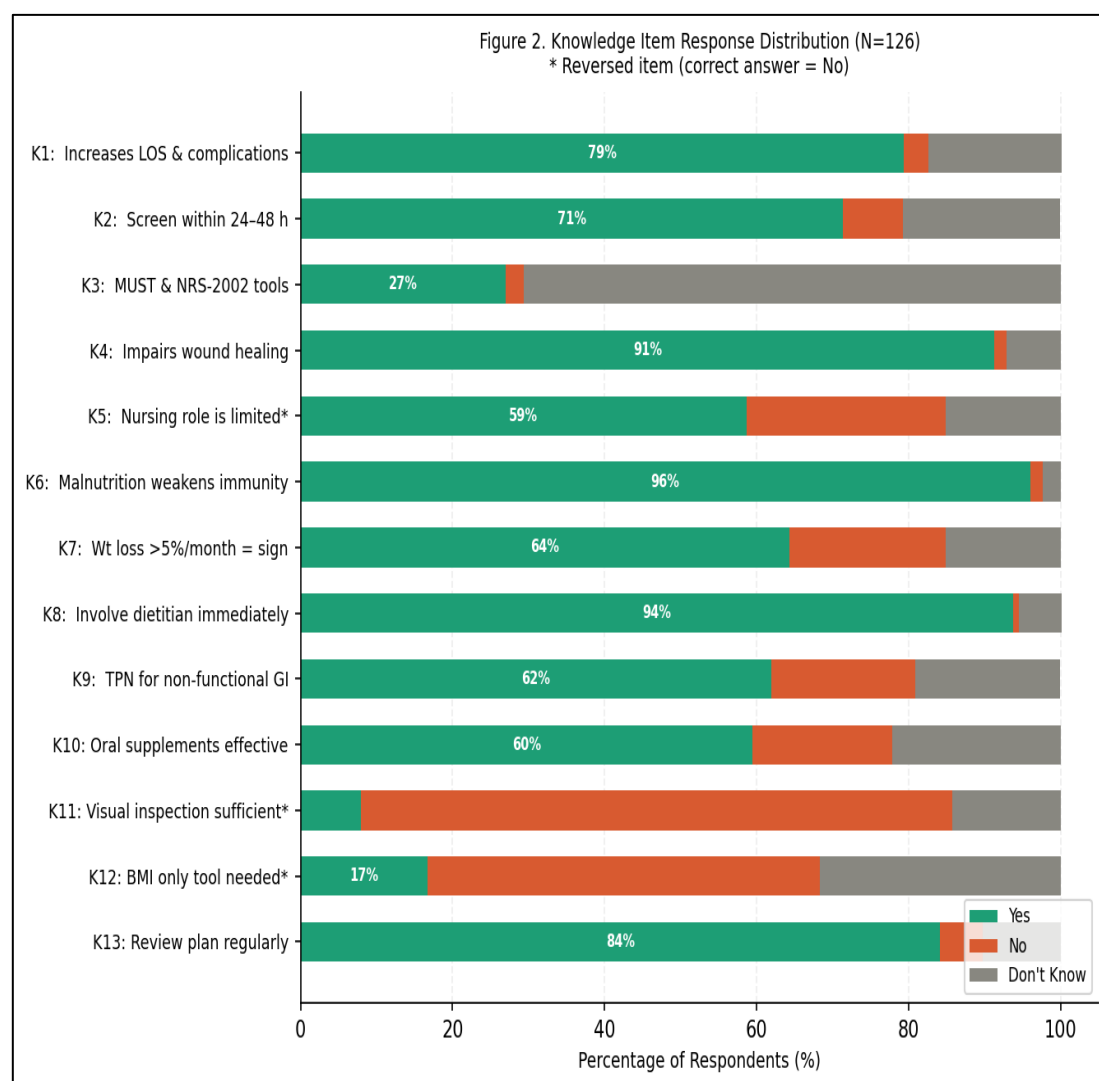


Figure 2. Knowledge Item Response Distribution (N=126). Stacked horizontal bars show percentage of Yes / No / Don't Know responses per item. Asterisk (*) indicates reversed items where 'No' is the correct response. K3 demonstrates the most critical gap with 70.6% 'Don't Know' responses.

Attitudes Domain

Table 3 displays statistics for attitude items. The average attitude score overall was $3.66 \pm 0.55/5.0$ (73.2%). Three items scored above the strong agreement threshold (≥ 4.0): A4 (nutrition improves outcomes, 4.35 ± 0.78), A6 (training

necessary, 4.15 ± 0.86), and A7 (family participation, 4.06 ± 0.86). The lowest rated item was A10 (hospital provides adequate nutritional support, 2.42 ± 1.12 ; mode=1, Strongly Disagree) which was the only negative attitude in the data set.

Table 3. Attitudes and Practices Domain Descriptive Statistics (N=126)

Item	Statement (abbreviated)	Mean	SD	Interpretation
ATTITUDES Attitudes Domain (Likert 1–5: 1=Strongly Disagree, 5=Strongly Agree)				
A1	Essential daily patient care	3.92	0.82	Agree
A2	All team participates in screening	3.57	1.06	Agree
A3	Lack of time is main barrier	3.02	1.14	Neutral
A4	Nutrition improves outcomes greatly	4.35	0.78	Strong Agree
A5	Personal responsibility for nutrition	3.78	0.92	Agree
A6	Continuous training is necessary	4.15	0.86	Strong Agree
A7	Family participates in planning	4.06	0.86	Strong Agree
A8	Low awareness = neglect	3.31	1.26	Neutral
A9	Clear protocols facilitate practice	3.99	0.84	Agree
A10	Hospital provides adequate support	2.42	1.12	Disagree
Practices Domain (Frequency Scale 1–5: 1=Never, 3=Sometimes, 5=Always)				
P1	Screen for malnutrition at admission	3.02	1.23	Sometimes
P2	Help patient with meals	3.15	1.36	Sometimes
P3	Monitor daily food intake	2.64	1.47	Rarely
P4	Notify dietitian of poor intake	3.04	1.54	Sometimes
P5	Encourage family to bring foods	3.77	1.33	Often
P6	Document nutritional status in records	2.90	1.60	Rarely
P7	Use MUST/NRS-2002 tools	2.60	1.55	Rarely
P8	Communicate with team on nutrition	2.92	1.43	Sometimes
P9	Provide nutritional health education	3.79	1.23	Often
P10	Monitor patient weight periodically	3.02	1.53	Sometimes

Overall Attitude Score: 3.66 ± 0.55 (73.2%); Overall Practice Score: 3.09 ± 1.10 (51.5%)

Practices Domain

The overall mean practice score was $3.09 \pm 1.10/5.0$ (51.5%) which was the lowest among the three KAP domains. The best performing practices were P9 (nutritional education to patient/family, 3.79 ± 1.23), and P5 (encourage family to bring preferred foods, 3.77 ± 1.33) which both reflect low-barrier interpersonal behaviors. The lowest practices

were P7 (use of validated screening tools MUST/NRS-2002, 2.60 ± 1.55 ; 41.3% 'Never'), P3 (monitoring daily food intake, 2.64 ± 1.47) and P6 (documenting nutritional status, 2.90 ± 1.60). P3, P6, P7 and P10 have high standard deviations (≥ 1.50) indicating that there is wide inter-individual variability. See table 3 and fig. 3.

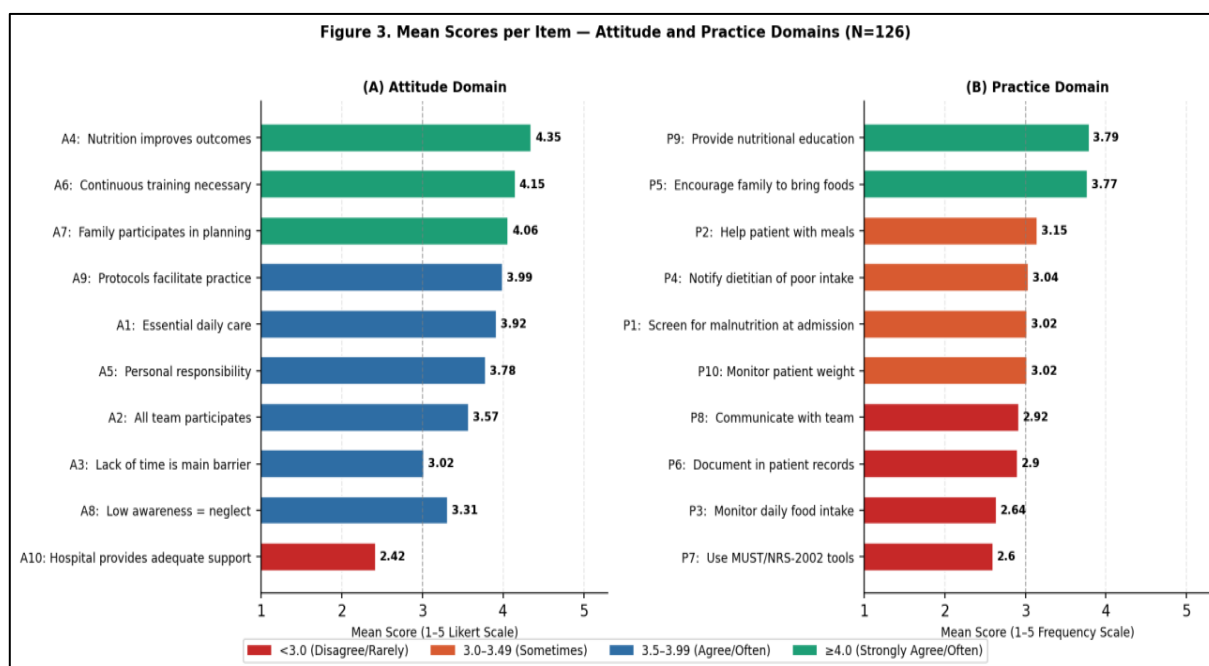


Figure 3. Mean Scores per Item — Attitude Domain (A) and Practice Domain (B) (N=126). Dashed vertical line at 3.0 denotes the neutral threshold. Colour coding: Red (<3.0), Orange/Blue (3.0–3.99), Green (≥4.0).

KAP Scores by Training Status and Professional Category

(A) Comparison of Training Status

Trained HCPs scored substantially higher on practices (3.67 vs. 2.96, $\Delta=+0.71$) and moderately higher on knowledge (8.82 vs. 7.97, $\Delta=+0.85$), while attitude scores were slightly lower (3.57 vs. 3.68).

(B) Comparisons by professional category

Nurses scored the highest knowledge score (8.77/13) followed by pharmacists (8.12) and the 'Other' group (7.25). Practice scores were highest in "Other" (3.29), then nurses (3.12) and pharmacists (2.93).

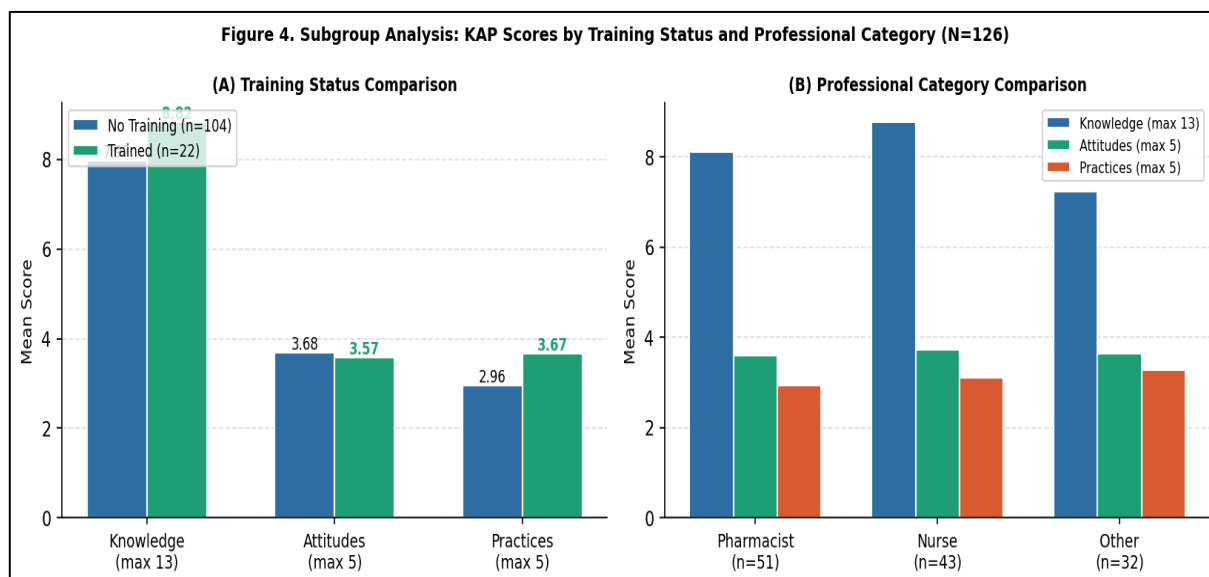


Figure 4. Subgroup Analysis. (A) KAP domain scores by training status: trained HCPs (n=22) demonstrate substantially higher practice scores (+0.71) compared to untrained (n=104). (B) KAP domain scores by professional category: nurses achieve the highest knowledge scores; the 'Other' group achieves the highest practice scores.

Qualitative Findings: Barriers and Recommendations

Barriers:

Eighty-eight individuals responded to the open-ended barriers question. Thematic analysis revealed six major themes, which are presented below in descending order of citations:

1. Lack of specialized nutritionists and nutrition support teams – the most cited barrier among all professional categories (>65% of participants reported this barrier). Some quotations: "No specialist, lack of knowledge, the nutritionist does not recommend the procedure"; "There are no nutrition specialists at all."
2. Inadequate finances and administration – lack of funds for proper hospital diet, poor quality of food services, poor kitchen hygiene. Participants said: "There are no funds and adequate facilities for that"; "Bribery within the food service management transformed it into business."
3. Lack of education and awareness – absence of proper nutritionist education among all professionals in the institution: "This problem is not even on the official agenda of the institution."
4. The lack of standardized screening process and documentation system – there is neither standardized procedure of patient admission screening nor standardized nutritional documentation guidelines.
5. Poor coordination and overlapping roles – lack of teamwork among various healthcare professionals, "Responsibility was distributed; there were no specialized teams."
6. Work-related constraints – specifically stated by nurses working in wards with high volume of patients.

RECOMMENDATIONS

The respondents made recommendations that fell into the following categories:

1. Hiring of dedicated clinical dietitians.
2. Regular compulsory training programs (minimum 5-8 courses per year).
3. Adopt a validated nutritional assessment at admission and regular monitoring.
4. Enhancement of hospital food quality and variety based on clinical condition.
5. Establishment of clear standardized treatment protocols for each disease category.
6. Adequate financial provision to hospital catering units.

7. Patient and Family Nutrition Education Campaigns.

8. Continuous monitoring and performance assessment systems.

DISCUSSION

An implementation gap between the attitudes, knowledge, and practices of HCPs in terms of malnutrition management is demonstrated in this study (73.2% > 62.5% > 51.5%, respectively), which is consistent with literature findings of other comparable studies – a systematic review of KAP studies in the Arab region revealed pooled mean scores of 55-70% for knowledge and always significantly lower for practice (Alsabri et al., 2024), while a multicentre study in Jordan (Ang et al., 2025) and a hospital-based study in Lebanon (Al-Hilfi et al., 2025; Dello Iacono et al., 2025; Mowe et al., 2006) showed nearly identical trends. In underdeveloped healthcare systems, positive professional values are not enough for the establishment of desired behaviour changes.

Most alarming individual result was the almost complete lack of awareness regarding MUST and NRS-2002 screening tools, as only 27.0% knew them (K3). Both tools are internationally recommended as the priority tools for bed-side nutrition risk assessment (Kondrup et al., 2003; Stratton & Elia, 2007), which explains why their use is the least common practice (P7: mean = 2.60; never: 41.3%). Similarly worrying is the statement of limited nursing role in nutrition assessments, agreed on by 58.7% of participants (K5), which could indicate hierarchy-based cultures within the clinical setting where nutritional risk screening is regarded as a physician's job – which directly contradicts the ESPEN recommendations (Weimann et al., 2021). The highly positive attitudes regarding the importance of proper nutrition in improving patients' outcome (A4: 4.35), as well as the necessity of staff training (A6: 4.15), show that there is high awareness among healthcare professionals regarding proper nutritional care and its importance, along with an identification of the necessity of learning about it. In other words, this can be considered a highly positive base for conducting further training interventions. Yet, the very negative attitude A10 ("hospital providing appropriate

infrastructure") (2.42) is the only indicator which acts as the structural indicator, i.e., it shows that hospitals do not create the appropriate conditions for nutritional care.

The 0.71-point difference (14.2 percentage points on the 5-point scale) in practice scores between trained (3.67) and untrained (2.96) HCPs is quite expected and is supported by many previous results (Laur et al., 2018; Treleaven et al., 2024). Given that 82.5% of participants are not trained in clinical nutrition, it appears that this would be the key point of intervention.

The alignment of the quantitative data and insights gained through the qualitative approach leads to a rather clear conclusion. Those participants, who pointed to the fact that a patient with poor financial means finds it hard to obtain enough food even outside the hospital, have implicitly drawn attention to the fact that social status adds extra risk to the prevalence of malnutrition in the context of post-war Iraq (UNDP Iraq, 2017). The recommendation to create nutrition support teams and conduct 5-8 training courses per year is a feasible solution based on the local specifics of the problem and the ESPEN institutional nutrition programme recommendations (Cederholm et al., 2017; Sorensen et al., 2008).

Limitations include possible biases related to self-reporting of the behaviour, a potential bias caused by a convenience sample, the small size of the trained-HCP subsample (n=22), and The survey's cross-sectional design makes it impossible to draw any inferences about causes and effects. Further research should apply the observational technique, include physicians as a separate group of participants and use longitudinal design when evaluating training effects (Correia et al., 2017).

CONCLUSION

The knowledge and attitudes of healthcare professionals regarding malnutrition management at Al-Hawija and Al-Abbasi district health facilities were moderately positive (73.2%) and suboptimal (62.5%), respectively, while their practices were markedly deficient (51.5%). The main results are: (1) only 17.5% are trained in clinical nutrition; (2) 70.6% do not know validated screening tools (MUST/NRS-2002); (3) trained

staff perform much better on practices (+0.71 points, i.e., 14.2 percentage points on the 5-point scale). The KAP gradient, supported by the quantitative scores and an abundance of qualitative data on barriers and recommendations, suggests that the implementation gap can be overcome by: mandatory clinical nutrition training; recruitment of dedicated dietitians; standardized admission screening protocols; and appropriate institutional resource allocation for nutritional care. These findings provide evidence base for informed health policy decisions in Kirkuk governorate and similar post-conflict healthcare systems.

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CONFLICT OF INTEREST

Regarding the publishing of this work, the authors state that they have no conflicts of interest.

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