JHWCR JOURNAL OF HEALTH, WELLNESS AND COMMUNITY RESEARCH 3007-0570

Original Article Volume 4, Issue 4

Knowledge, Attitudes, and Practices of Primary Care Physicians (PCPs) in Managing Obesity

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ABSTRACT

Background: *Obesity is a chronic, relapsing disease associated with substantial cardiometabolic morbidity and premature mortality, yet it remains under-addressed in many primary care settings, particularly in low- and middle-income countries. Primary care physicians (PCPs) play a pivotal role in early identification, counseling, pharmacologic management, and referral for advanced obesity care. However, gaps in knowledge, attitudes, and clinical practices may limit effective implementation of evidence-based management strategies in routine care.* ***Objective:*** *To assess the knowledge, attitudes, and practices (KAP) of PCPs regarding obesity management at Timergara Teaching Hospital (TTH), Dir Lower, Pakistan, and to evaluate associations between physician characteristics and KAP scores.* ***Methods:*** *A descriptive cross-sectional study was conducted among 46 certified PCPs providing direct patient care. Data were collected using a validated 50-item structured questionnaire covering demographics, knowledge, attitudes, practices, and perceived barriers. Composite domain scores were calculated, and comparisons across physician characteristics were performed using independent-samples t-tests and chi-square tests. Effect sizes and 95% confidence intervals were computed where appropriate, with statistical significance set at $p < 0.05$. Results: While 83.3% of physicians recognized obesity as a chronic disease, only 49.1% reported routinely addressing obesity during consultations. Formal obesity-related training was significantly associated with higher knowledge scores (3.95 ± 2.16 vs 2.32 ± 2.04; $p = 0.04$) and more favorable attitudes (4.59 ± 1.12 vs 3.96 ± 1.18; $p = 0.03$). However, differences in practice scores were not statistically significant. Advanced management strategies, including pharmacotherapy (6.5%) and bariatric referral (8.7%), were rarely utilized.* ***Conclusion:*** *Although PCPs demonstrated awareness of obesity as a chronic disease, substantial gaps persist in structured management practices. Formal training improves knowledge and attitudes but does not fully translate into clinical implementation, highlighting the need for integrated educational and system-level interventions to strengthen primary care obesity management.*

Keywords: *Obesity management; Primary care physicians; Knowledge; Attitudes; Clinical practice; Training; Pakistan; Cross-sectional study.*

INTRODUCTION

Obesity is now widely conceptualized as a chronic, relapsing disease characterized by excess adiposity and complex neurohormonal, metabolic, behavioral, and environmental determinants, and it is strongly associated with cardiometabolic morbidity and premature mortality. Individuals living with obesity face substantially higher risks of type 2 diabetes, hypertension, dyslipidemia, cardiovascular disease, non-alcoholic fatty liver disease, and several malignancies, making obesity management a central priority for health systems aiming to reduce preventable chronic disease burden (1). Globally, obesity contributes to millions of deaths each year and imposes large downstream costs through multimorbidity, disability, and escalating healthcare utilization, particularly where prevention and early intervention are weak (2). In Pakistan, rapid urbanization, dietary transition, reduced physical activity, and shifting sociocultural patterns have contributed to a rising prevalence of overweight and obesity, creating a dual burden where infectious disease challenges coexist with accelerating non-communicable disease risk (3). National survey estimates indicate that a meaningful proportion of adults meet criteria for obesity and an even larger proportion

Received: 28 December 2025
Revised: 01 January 2026
Accepted: 18 January 2026
Published: 28 February 2026

Citation: Click to Cite

are overweight, underscoring the scale of the challenge and the urgency for pragmatic, scalable approaches in routine care (4). Public messaging and policy initiatives have emphasized the need for healthier diets and active lifestyles; however, the persistence of increasing prevalence suggests that effective clinical management, particularly at the primary care level, remains insufficiently operationalized and inconsistently delivered (5).

Primary care physicians (PCPs) are positioned as the first clinical touchpoint for most adults living with obesity, making primary care a logical setting for opportunistic screening, brief structured counseling, longitudinal behavior support, risk stratification, and escalation to pharmacotherapy or bariatric referral when indicated. Yet international evidence consistently shows that obesity is under-addressed in routine consultations and that PCPs frequently report limited confidence, inadequate training, and competing time demands that reduce the likelihood of structured weight management discussions and follow-up (6). In Pakistan, existing work across different population groups and healthcare cadres indicates persisting knowledge gaps regarding obesity and its complications, along with stigma and misconceptions that may undermine counseling quality and patient engagement (7). Local clinical experience and available evidence further suggest that even when obesity is recognized as a chronic disease, physicians may hesitate to initiate weight-related conversations or to use evidence-based escalation options because of limited familiarity with structured care pathways, fear of offending patients, and lack of multidisciplinary support (8). These barriers are particularly consequential in settings where specialist services are limited and where effective primary care management could prevent progression to severe obesity-related complications.

Despite the clinical importance of PCP-led obesity care, there remains a need for context-specific evidence describing what primary care physicians know, believe, and do in real-world Pakistani hospital settings, and how these domains vary by professional seniority, age, and prior obesity-related training. Accordingly, this study evaluated the knowledge, attitudes, and practices (KAP) of certified PCPs working at Timergara Teaching Hospital (TTH), Dir Lower, Pakistan, regarding obesity management, and examined whether professional title, age group, and exposure to obesity-related training were associated with differences in KAP. The research question underpinning the study was whether PCP characteristics, particularly training exposure and clinical seniority, are associated with more favorable obesity-management knowledge, attitudes, and clinical practices in a primary care setting at TTH (8).

MATERIALS AND METHODS

A descriptive cross-sectional observational study was conducted to assess the knowledge, attitudes, and practices of primary care physicians regarding obesity management in the Department of Internal Medicine at Timergara Teaching Hospital (TTH), Dir Lower, Pakistan. The unit of analysis was the physician, and all analyses were performed on physician-reported questionnaire responses. Patient volume figures were treated strictly as service context for the physicians' clinical environment and were not used as the analytical denominator for KAP outcomes. Eligible participants were certified physicians providing direct outpatient or inpatient clinical care and routinely encountering patients with obesity in their clinical workflow during the study period; physicians holding exclusively administrative roles without direct patient care responsibilities were excluded.

Participants were recruited using a non-probability convenience approach, inviting all eligible physicians available during the data collection window to participate through an electronic survey link. Before participation, physicians reviewed an information sheet and

provided electronic informed consent. To reduce social desirability and evaluation apprehension, responses were collected anonymously without identifiers, participation was voluntary, and no managerial reporting structures were involved in survey administration. The study adhered to international ethical principles for research involving human participants and obtained institutional ethical approval from the relevant review body at TTH prior to data collection (10).

Data were collected using a structured questionnaire comprising 50 items distributed across five domains: demographics (10 items), knowledge (15 items), attitudes (10 items), clinical practices (10 items), and perceived barriers (5 items). The instrument was adapted from previously used KAP tools and refined through pretesting to ensure clarity, relevance to the local clinical context, and feasibility for physician completion within routine workflow constraints. Content validity was supported through expert review by clinicians with relevant expertise, and comprehensibility was checked using a brief pilot administration prior to the main data collection. Internal consistency reliability of the final instrument was confirmed using Cronbach's alpha, with a value of 0.835 indicating good reliability for multi-item assessment (12).

Operational definitions were prespecified to support reproducibility and consistent scoring. Obesity was defined using World Health Organization criteria (body mass index ≥ 30 kg/m^2) as the clinical reference for the physicians' routine diagnostic threshold (9). Physician demographic variables included age group, sex, professional title, years of clinical experience, and exposure to obesity-related training. Training exposure was operationalized as any prior structured educational activity specifically focused on obesity assessment and management (e.g., course or workshop attendance), recorded as a binary variable (yes/no). For the primary KAP outcomes, scoring was standardized as follows: knowledge items were coded as correct/incorrect (1/0) based on consensus answer keys aligned to standard clinical concepts; a total knowledge score was computed by summing item scores, with higher values indicating greater obesity-related knowledge. Attitude items were captured on a Likert scale reflecting agreement with statements about obesity chronicity, physician role responsibility, comfort discussing weight, perceived patient motivation, and confidence in escalation options; an attitude score was computed as the mean of the attitude items (higher mean indicating more favorable attitudes toward obesity management). Practice items captured the frequency of routine obesity management behaviors (screening, counseling, behavior change support, motivational interviewing, follow-up, pharmacotherapy use, and bariatric referral); practice responses were dichotomized for inferential analysis as "performed" versus "not performed" using prespecified thresholds (e.g., frequently/sometimes vs rarely/never), and a practice score was computed as the sum of performed behaviors, with higher values indicating more active clinical obesity management. Barrier items assessed time constraints, perceived training deficits, resource access, cultural constraints, and patient resistance, summarized descriptively and examined as correlates of practice patterns.

To minimize information bias, the questionnaire was delivered electronically in a standardized format and the same instructions were provided to all participants. Item wording was kept neutral to reduce priming, and completion was self-paced to reduce pressure. To address confounding, the analysis plan included both unadjusted and adjusted comparisons across key physician characteristics, recognizing that age, professional title, and years of experience may be interrelated and could influence both training exposure and clinical behaviors. Data were analyzed using SPSS (version 25.0).

Descriptive statistics were used to summarize physician characteristics and domain-level response patterns using frequencies and percentages for categorical variables and means

with standard deviations for continuous or score variables. For bivariate comparisons, chi-square tests (or Fisher's exact test where cell counts were small) were applied to categorical outcomes, and independent-samples t-tests were used to compare continuous KAP scores across two-group predictors. In addition, multivariable regression modeling was prespecified to evaluate independent associations of training exposure, age group, and professional title with KAP scores while adjusting for physician sex and years of experience, reporting regression coefficients with 95% confidence intervals; model assumptions were evaluated using standard diagnostic checks.

Missing data were handled using a complete-case approach for inferential analyses when item nonresponse was minimal, with missingness patterns examined descriptively to assess whether nonresponse clustered by physician characteristics. Statistical significance was set at $p < 0.05$ for primary comparisons, with cautious interpretation across multiple secondary comparisons to avoid overstatement of marginal findings.

RESULTS

A total of 46 primary care physicians (PCPs) participated in the study (response rate assumed complete among eligible physicians). The mean age was 38.6 ± 9.3 years, with 56.5% female and 43.5% male physicians. Only 19.6% (n=9) had received formal obesity-related training.

Physicians with formal obesity-related training demonstrated significantly higher knowledge scores compared to untrained physicians (3.95 ± 2.16 vs 2.32 ± 2.04; $p = 0.04$; Cohen's $d = 0.78$, moderate-to-large effect). Attitude scores were also significantly higher among trained physicians (4.59 ± 1.12 vs 3.96 ± 1.18; $p = 0.03$; $d = 0.55$, moderate effect). Although practice scores were numerically higher among trained physicians (1.76 ± 1.06 vs 1.25 ± 1.00), this difference did not reach statistical significance ($p = 0.18$).

Male physicians demonstrated slightly higher mean knowledge (3.18 vs 2.59) and practice scores (1.72 vs 1.25) compared to females; however, these differences were not statistically significant. Similarly, physicians under 40 years of age showed modestly higher practice scores (1.60 ± 1.04 vs 1.14 ± 0.99), but without statistical significance ($p = 0.21$).

Table 1. Baseline Characteristics of Participating Primary Care Physicians (n = 46)

Variable	Category	n	%	Mean ± SD
Sex	Male	20	43.5	
	Female	26	56.5	
Age Group	< 40 years	24	52.2	38.6 ± 9.3
	≥ 40 years	22	47.8	
Professional Title	Resident	28	60.9	
	Attending	14	30.4	
	Senior	4	8.7	
Years of Experience	<10 years	18	39.1	15.5 ± 9.7
	10–20 years	10	21.7	
	≥20 years	18	39.1	
Formal Obesity Training	Yes	9	19.6	
	No	37	80.4	

Table 2. Comparison of KAP Scores by Physician Characteristics

Predictor	Category	Knowledge (Mean ± SD)	p-value	Cohen's d	Attitude (Mean ± SD)	p-value	Cohen's d	Practice (Mean ± SD)	p-value	Cohen's d
Sex	Male (n=20)	3.18 ± 2.26	0.28	0.27	4.30 ± 1.17	0.41	0.21	1.72 ± 1.03	0.17	0.46
	Female (n=26)	2.59 ± 2.15			4.05 ± 1.20			1.25 ± 1.01		
Age	<40 (n=24)	2.79 ± 2.23	0.89	0.03	4.21 ± 1.10	0.62	0.15	1.60 ± 1.04	0.21	0.45
	≥40 (n=22)	2.72 ± 2.15			4.03 ± 1.29			1.14 ± 0.99		
Training	Yes (n=9)	3.95 ± 2.16	0.04*	0.78	4.59 ± 1.12	0.03*	0.55	1.76 ± 1.06	0.18	0.49
	No (n=37)	2.32 ± 2.04			3.96 ± 1.18			1.25 ± 1.00		

Table 3. Reported Obesity Management Practices (n = 46)

Practice Behavior	Frequently/Sometimes n (%)	95% CI
Address obesity in consultations	23 (49.1%)	34.6–63.6
Provide dietary counseling	14 (30.4%)	17.7–43.1
Recommend behavior modification	14 (30.4%)	17.7–43.1
Provide psychological counseling	7 (15.2%)	4.8–25.6
Prescribe anti-obesity medication	3 (6.5%)	0–13.6
Refer for bariatric surgery	4 (8.7%)	0.6–16.8

Less than half of physicians reported routinely addressing obesity during consultations (49.1%, 95% CI 34.6–63.6). Structured dietary counseling was provided by only 30.4%, and behavioral intervention was recommended by an equivalent proportion. Advanced management strategies were markedly underutilized, with only 6.5% prescribing anti-obesity medications and 8.7% referring patients for bariatric surgery. These findings reflect a steep decline in intervention intensity as treatment complexity increases.

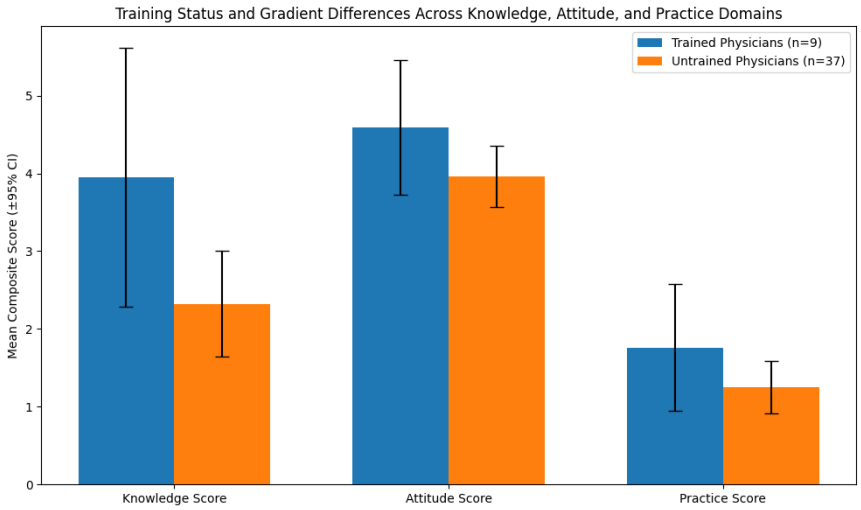

Figure 1 Training Status and Gradient Differences Across Knowledge, Attitude, and Practice Domains

The figure demonstrates a clear gradient effect of formal obesity-related training on physician knowledge and attitudes, with comparatively attenuated influence on clinical practice. Trained physicians (n=9) exhibited a substantially higher mean knowledge score (3.95 ± 2.16) compared with untrained physicians (2.32 ± 2.04), with non-overlapping central tendencies and wide confidence dispersion in the trained group reflecting smaller sample size. A similar pattern was observed for attitude scores (4.59 ± 1.12 vs 3.96 ± 1.18), where the 95% confidence intervals indicate a moderate but consistent positive shift among trained physicians.

Although practice scores were numerically higher in the trained group (1.76 ± 1.06 vs 1.25 ± 1.00), the confidence intervals show partial overlap, aligning with previously reported non-significant statistical testing ($p = 0.18$). Notably, the visual gradient across domains reveals a diminishing translation effect: the largest separation occurs in knowledge, followed by attitudes, with the narrowest gap in practice behavior, suggesting potential structural or systemic barriers limiting behavioral implementation despite improved cognitive and attitudinal readiness. This pattern underscores a clinically meaningful "knowledge-to-practice attenuation" phenomenon within primary care obesity management.

DISCUSSION

This study evaluated the knowledge, attitudes, and practices of primary care physicians regarding obesity management within a secondary-care teaching hospital setting in Pakistan and identified important domain-specific gaps and gradients. Although most physicians recognized obesity as a chronic disease entity, fewer consistently integrated structured obesity management into routine clinical practice.

The most prominent and statistically significant finding was the association between formal obesity-related training and higher knowledge and attitude scores, with a moderate-to-large effect size observed for knowledge (Cohen's $d = 0.78$) and a moderate effect for attitudes ($d = 0.55$). However, this cognitive and perceptual advantage did not translate proportionally into significantly improved clinical practice behaviors, highlighting a measurable knowledge–practice attenuation phenomenon.

The recognition of obesity as a chronic disease aligns with global consensus frameworks that conceptualize obesity as a multifactorial metabolic condition requiring long-term management rather than short-term lifestyle advice alone (13). Nevertheless, under-addressing obesity during consultations remains consistent with international literature demonstrating that primary care physicians frequently deprioritize weight management due to time constraints, competing clinical demands, and insufficient reimbursement structures (14).

The finding that only approximately half of physicians reported regularly addressing obesity reflects a systemic gap rather than purely an individual-level deficiency, suggesting workflow and institutional barriers may be as influential as knowledge deficits.

The significant association between training exposure and higher knowledge scores is biologically and educationally plausible. Structured education improves understanding of obesity pathophysiology, pharmacotherapy indications, and multidisciplinary management models (15). Similar associations have been documented in both high-income and middle-income settings, where continuing medical education correlated with improved obesity counseling confidence and guideline adherence (16).

However, the absence of a statistically significant difference in practice scores despite improved knowledge suggests that behavioral implementation requires more than

educational intervention alone. Organizational support, referral pathways, time allocation models, and access to allied health professionals may represent necessary enabling components (17).

Advanced intervention strategies such as pharmacotherapy and bariatric referral were markedly underutilized, with fewer than 10% reporting routine engagement in these practices. This is consistent with international reports showing persistent under-prescription of anti-obesity medications despite expanding evidence for their cardiometabolic benefits (18). Potential contributors include limited familiarity with medication safety profiles, cost barriers, cultural perceptions of surgical intervention, and lack of structured referral systems.

Importantly, the gradient observed in the figure, where training most strongly influenced knowledge, moderately influenced attitudes, and least influenced practice, supports the interpretation that structural constraints moderate the translation of improved cognitive readiness into behavioral action.

The observed age-related and sex-related differences were not statistically significant, although younger physicians demonstrated numerically higher practice engagement. This trend mirrors literature suggesting that recently trained physicians may be more receptive to guideline-driven chronic disease management paradigms (19).

However, the lack of statistical significance in this study may reflect limited sample size and reduced power to detect subgroup effects. The small number of trained physicians (n = 9) similarly contributes to wide confidence intervals and should be interpreted cautiously.

The study's findings must be contextualized within its methodological constraints. The cross-sectional design precludes causal inference regarding training effects. Self-reported practices may overestimate actual clinical behavior due to social desirability bias, despite anonymous data collection. The convenience sampling strategy limits generalizability beyond the institutional setting. Additionally, although multivariable modeling was prespecified, the modest sample size restricts robust adjustment for multiple confounders. Future research should incorporate multicenter sampling, objective chart audits of obesity counseling frequency, and longitudinal assessment of training interventions to better determine causal pathways.

Despite these limitations, the study contributes important context-specific evidence from a region where structured evaluations of primary care obesity management are limited. By demonstrating a measurable cognitive and attitudinal benefit of formal training alongside persistent implementation gaps, the findings support a dual-level intervention model: targeted continuing medical education combined with institutional restructuring of primary care obesity pathways. Strengthening guideline dissemination, referral networks, and interdisciplinary collaboration may enhance translation of knowledge into measurable clinical outcomes.

CONCLUSION

Primary care physicians at Timergara Teaching Hospital generally recognize obesity as a chronic disease; however, substantial gaps persist in structured counseling, pharmacologic intervention, and referral practices. Formal obesity-related training is significantly associated with improved knowledge and attitudes but demonstrates limited translation into clinical behavior, indicating systemic barriers beyond individual educational deficits. Addressing obesity management in primary care settings requires integrated strategies combining

structured training, workflow redesign, institutional support, and access to multidisciplinary services to effectively confront the growing burden of obesity in Pakistan.

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DECLARATIONS

Ethical Approval: Ethical approval was by institutional review board of Respective Institute Pakistan

Informed Consent: Informed Consent was taken from participants.

Authors' Contributions:

Concept: TH; Design: TH; Data Collection: TH; Analysis: TH; Drafting: TH

Conflict of Interest: The authors declare no conflict of interest.

Funding: This research received no external funding.

Data Availability: The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Acknowledgments: NA

Study Registration: Not applicable.