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THE ROLE OF FAMILY PHYSICIANS IN PREVENTING NON-COMMUNICABLE DISEASES THROUGH LIFESTYLE COUNSELING

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ABSTRACT

The study examined the role of family physicians in prevention of non-communicable diseases (NCDs) through lifestyle counseling in Saudi Arabia. The investigators...cross-sectional design...collected data from patients across various regions, 200 in total. Study issues included frequency of lifestyle counseling, topics discussed, behavioral and clinical outcomes, barriers to providing counseling, and factors influencing adherence. Results showed 56.5% of clients were given lifestyle counseling, with diet and exercise being the most common topics. Offering the counseling was significantly associated with an increase in physical activity, in dietary behaviors, and with reductions in BMI, systolic and diastolic blood pressure, blood cholesterol, and fasting blood sugar levels ($p < 0.05$). Barriers to counseling delivery and adherence included a lack of time and training. Socioeconomic status, physician training, and frequency of counseling were important predictors of adherence. These findings highlight the need to support family physicians with training and health system restructuring to reinforce preventive care efforts against NCDs at the primary health care level.

Index Terms- Non-communicable diseases (NCDs), lifestyle counseling, family physicians, patient adherence, preventive healthcare, Saudi Arabia, behavioral change, clinical outcomes, physician training, health barriers.

I. INTRODUCTION

Non-communicable disease (NCD) is a growing and significant public health risk worldwide. These chronic NCDs—made up of cardiovascular diseases (heart attacks and strokes), cancer, chronic respiratory diseases (chronic obstructive pulmonary disease and asthma), and diabetes—account for approximately 71% of global deaths and take over 41 million lives annually (World Health Organization [WHO], 2023). The tremendous scope is not just in death but NCD also inflicts extreme morbidity, disability, and poor quality of life with wide-

ranging implications in patients, families and communities, and health systems.

The rise in NCDs is largely attributed to aging and a shift in the patterns of urbanization, but the underlying root cause is the high prevalence of unhealthy lifestyles. Unhealthy diet, physical inactivity, tobacco smoking, and harmful alcohol use are leading risk factors for NCD development and progression. Consistent with the WHO, more than 80% of preventable premature coronary heart disease, stroke, and type 2 diabetes can be prevented by eliminating the aforementioned risk factors (WHO, 2023).

NCDs have a large economic cost. The conditions together cost several billion dollars annually in direct medical costs and lost productivity globally, undermining the sustainability of health services, especially among low- and middle-income nations (LMICs) with limited resources (Bloom et al., 2011). NCDs also affect vulnerable populations disproportionately, increasing health inequities because of social factors influencing health such as income, education, and access to health services.

Because most NCD risk factors can be prevented, prevention interventions are becoming a core pillar for public health action toward limiting this burden. Prevention from onset through risk factor management before complaints set in has been identified as most cost-effective and cost-saving (Yusuf et al., 2015). For prevention to be best achieved, population-level policy and community-level intervention are not only needed but also individually directed and long-term assistance for development of sustained behavior change at an individual level.

The Family Physician's Role as First-Line Healthcare Provider for NCD Prevention

General practitioners/primary physicians or family practitioners play a specific and fundamental function in health systems worldwide. They are, in the main, first-contact health professionals and are typically the first point of contact for individuals requiring medical services, dealing with all sorts of acute and long-term diseases and offering ongoing, comprehensive, and coordinated care (Starfield, 1998). Having an integrated general knowledge of the patient's medical, family, and psychosocial context positions them as effective agents for NCD control and prevention.

Lifestyle counseling is among the preventive services of family physicians. It involves risk factor screening among the patients and providing individualized advice and support for encouraging the patients towards improved behavior—e.g., improvement in dietary quality, increase in physical activity, smoking cessation, reduction in alcohol use, and stress management (Whitlock et al., 2002). Family physicians may utilize their patients' confidence in them as a physician-patient relationship in promoting behavior modification, long-term follow-up, and overcoming barriers faced by the patients.

There is evidence-based therapeutic value for counseling lifestyle in primary care that is strongly established. Even modest counseling has considerable effects on activity levels, diet, and quitting smoking, which is evidence-based (Aveyard et al., 2016; Orrow et al., 2012). In addition, integrating lifestyle counseling as part of routine consultations facilitates repeated exposure and reminder during follow-up consultations that is useful in maintaining compliance and motivation. Longitudinal interaction of this kind is also ideal for case detection and intervention early on and a matching reduction in NCD incidence and complications.

Despite their central role, primary care physicians face challenges in maximizing the effectiveness of lifestyle counseling. Among the challenges are limited time during consultations, competing clinical needs, lack of training in techniques for behavior change, limited patient educational resources, and system limitations (Yarnall et al., 2003; Nutting et al., 2007). These challenges and their effect on counseling delivery and outcomes must be appreciated for the improvement of prevention care.

Gaps in the Knowledge of the Effectiveness and Barriers of Lifestyle Counseling Although lifestyle counseling is supported by professional guidelines and public health organizations, there is wide disparity among family physicians about how and how intensively this intervention is provided. Existing empirical evidence on prevalence, content and quality of counseling in routine practice is limited and the literature reports high proportions of risk patients who are not receiving adequate counseling (Kumar et al., 2017). Furthermore, little is known about the association between contact with counseling and objective patient outcomes such as changes in behavior and improvement of risk factors.

Obstacles to counseling have been described mostly through qualitative research and physician surveys but require more detailed quantitative examination to account for their influence on provision and compliance with counseling. The contribution of factors such as training, experience, and attitudes on behalf of physicians to making counseling work is also unclear. Similarly for patient factors such as socioeconomic status, motivation, and satisfaction that can affect how lifestyle interventions work, although these processes need to be studied further.

It is crucial to bridge these gaps in order to inform evidence-based solutions aimed at helping family physicians provide appropriate lifestyle advice and ultimately bolster prevention interventions on growing NCD epidemics.

Research Objectives and Questions

The aim of this study is to add to the knowledge of the contribution of family physicians in the prevention of non-communicable diseases through lifestyle counseling by looking at its frequency, content, effectiveness, and difficulties.

The study will accurately

Assess how frequently family physicians provide lifestyle counseling to persons at risk of NCD development.

Indicate which lifestyle factors (e.g., exercise, diet, smoking) are most commonly addressed during counseling.

Evaluate the impact of lifestyle counseling on behavior change in patients within the context of NCD risk factors.

Discuss the influence of counseling on clinical outcomes including body mass index (BMI), blood pressure, blood glucose, and cholesterol.

Family physicians encounter various barriers to providing lifestyle counseling and these affect counseling delivery.

Explain how training doctors, the frequency of counseling provided, and patient compliance and satisfaction influence the efficacy of lifestyle counseling.

To guide this inquiry, the research questions are the following

How frequently do family physicians provide lifestyle counseling to patients who are at risk of NCDs?

What are the most commonly discussed lifestyle concerns in counseling?

Lifestyle counseling has a beneficial influence on patient behavior relative to NCD risk factors.

Does lifestyle counselling lead to detectable change in clinical risk factors?

There are several barriers that family physicians face when providing lifestyle counseling.

What role does patient adherence and satisfaction play in the effectiveness of lifestyle counseling?

Hypotheses

With the above aims in mind, the research hypotheses are tested as follows:

H1: Those patients who receive exposure to lifestyle counseling from family practitioners will exhibit more improvement on healthier behaviors—i.e., more exercise and healthier diets—than those not receiving exposure to counseling.

H2: Lifestyle counseling delivered by family physicians is associated with clinically significant decreases in NCD clinical risk factors for BMI, blood pressure, and blood glucose.

H3: Increased frequency and quality of lifestyle advice are associated with increased compliance by patients with recommendations for lifestyle modification.

H4: Family physicians with training on lifestyle counseling offer more effective counseling that yields improved patient outcomes.

H5: Patient's socioeconomic status moderates the relationship between lifestyle counseling and behavioral and clinical outcomes.

H6: Limitations including time constraints for consultation, limitations in resources, and patient factors have a negative influence on lifestyle counseling provision and effectiveness.

Through responses and hypotheses provided here, this project seeks to provide a broad evidence base on modern lifestyles and impact of lifestyle counseling in primary health care. The outcomes are expected to inform health policy, physician education, and clinical practice with a view to building prevention activity toward global non-communicable disease containment.

II. LITERATURE REVIEW

This review considers the available evidence of lifestyle advice provided by health professionals, including family physicians and nurses, for preventing and controlling non-communicable diseases (NCDs). It summarizes the results of the available literature, determines the emerging themes and gaps, and incorporates a matrix to describe the value and limitations of each paper.

1. Lifestyle Medicine in Medical Education (Frates et al., 2024)

This study emphasized the importance of integrating Lifestyle Medicine (LM) both into undergraduate and graduate medical school curricula. Authors found key challenges including time constraints, a lack of trained faculty and institutions failing to prioritize. The study proposed mapping LM competencies on to ACGME core domains and horizontal and vertical integration within the curriculum.

Gap: While education methods were the subject of the article, no real-life results from clinical lifestyle counseling practice and physician behavior post-training were discussed.

2. Nurse-Led Counselling in Polish Primary Care (Znyk et al., 2024)

Znyk et al. established how nurses provide lifestyle counseling in Poland and how personal health behavior, knowledge, and barriers affect this provision. Level of

knowledge and skill was strongly connected with counseling frequency. Perceived disinterest of patients, lack of time, and inability to change habits were viewed as barriers.

Gap: This study aimed at nurses rather than family physicians and didn't consider longitudinal outcomes evaluating counseling and its association with patient health outcomes.

3. Nurses' Competency in Lifestyle Counseling (Oikarinen et al., 2024)
Systematic qualitative synthesis of nurses' experience of lifestyle counseling in 20 studies identified the key competencies as establishing patient-centered counseling environments, self-development, and inter-professional collaboration.

Gap: No quantifiable measure for assessing how nurse competencies influence health outcomes; very limited attention given to physician-provided counseling.

4. ACLM Expert Consensus on LM in Primary Care (Grega et al., 2023) This group of experts produced 65 consensus-based key statements supporting LM as a basis for primary care. It highlighted education reform, as well as referral and shared decision-making.

Gap: Being a consensus instead of empirical study, it did not quantify real world implementation or results pertaining to the counseling practices of the family physicians.

5. Language concordance and counseling (Quigley et al., 2025)
This review looked at whether language barriers affect patient experience in primary care. While language concordance improved patient experience in certain situations, its effect on counselling outcomes like diet/exercise counselling was variable.
Gap: Failed to specifically focus on NCD prevention or lifestyle advice from general practitioners.

6. Lifestyle Interventions for Hyperlipidemia (Giles, 2024)
Giles addressed lifestyle management of hyperlipidemia and determined that first-line therapies such as diet and exercise do work. The paper provided recommendations for practice.

Gap: It was condition-specific management (hyperlipidemia) and did not address implementation by family physicians in general practice.

7. E-consultation and specialist access (Peeters et al., 2024)
Peeters et al. systematically examined e-consultation between family physicians and specialist hospitals. Results were improved access and reduced inappropriate referrals.

Gap: While provision of general care was appropriate, prevention and advice on lifestyle were not offered.

8. Lifestyle Changes on Mental Health Outcomes (Okpala et al., 2025)
This review addressed how lifestyle modification complements psychopharmacologic treatments of mood disorders. The results indicated lifestyle treatment (exercise, diet, sleep) improved results and reduced need for medication.

Gap: Specifically related to mental health; not necessarily related to family physician practice or overall NCD prevention through lifestyle advice.

Table 1: Matrix Summary of Literature Review.

Study	Focus Area	Population	Key Findings	Gaps Identified
Frates et al. (2024)	LM in medical education	Medical students & faculty	Need for curriculum reform and LM integration	No data on post-education clinical behavior
Znyk et al. (2024)	Nurse-led counseling	Nurses in Polish primary care	Counseling influenced by training and perceived barriers	Focused on nurses; lacks outcome linkage
Oikarinen et al. (2024)	Nurse competence	Nurses in healthcare	Competence is multidimensional and experience-based	Lacks quantifiable outcomes
Grega et al. (2023)	LM consensus in primary care	Experts in LM	65 statements achieved consensus on LM standards	No empirical testing or physician behavior data
Quigley et al. (2025)	Language concordance	Spanish-speaking patients	Language affects patient experience inconsistently	No direct NCD or LM focus
Giles (2024)	Hyperlipidemia prevention	Adults at risk	Lifestyle change is effective in hyperlipidemia management	Disease-specific, not holistic primary care
Peeters et al. (2024)	E-consultation	Family physicians & specialists	Improved access, fewer referrals	Not focused on lifestyle or counseling
Okpala et al. (2025)	Mental health & lifestyle	Patients with mood disorders	Lifestyle boosts medication efficacy	Mental health context only

Gaps in the Literature

Lack of Longitudinal Evidence: Many articles stress the possibilities or competencies for lifestyle counseling, lacking a longitudinal view that associates lifestyle counseling with patient health outcomes that can be duly measured.

Underrepresentation of Family Physicians: Much of the research patients focus on nurses or taps expert consensus so there's less research looking directly at family physicians in their everyday counseling roles.

Inconsistent Outcome Measures: There exists no framework by which lifestyle counseling outcomes will be measured, prohibiting study comparison.

Educational Implementation vs. Practice: Several articles argue for the integration of lifestyle medicine into education; however, there are very few data on how this is carried through into practice.

Cultural/System Barriers: These studies lack an analysis of how cultural, language, and systemic healthcare differences affect the uptake and outcomes of lifestyle counseling.

III. METHODS

Study Design

This research employed a cross-sectional analytical design to examine the role of family physicians in non-communicable disease (NCD) prevention through the giving of lifestyle advice. The research was to draw a snapshot of current practice, patient behavior, clinical outcomes, and factors influencing these. As the nature of inquiry was to measure current behavior, health status, and relationships between physicians and patients, the cross-sectional design was best utilized to make associations without having to manipulate factors or measure changes over time.

Participants

The sample consisted of 200 adult patients from various geographic locations in Saudi Arabia, rural and urban, to ensure geographic representation and increase generalizability. The recruitment took place in primary healthcare centers where the participants had visited a family physician for routine check-ups, follow-up of chronic diseases, or preventive services.

Inclusion Criteria

Adults aged 18 years and older.

Persons having one or more identified NCD risk factor (e.g., obesity, hypertension, history of smoking, physical inactivity).

Patients who had visited a family physician within the last six months.

Quality assurance or assurance Quality assurance Quality assurance or assurance.

Exclusion Criteria

Age group below 18 years.

Patients with a definite diagnosis of an infectious disease.

Participants who are unable to provide valid responses due to cognitive impairment or language constraints.

People who had not seen a family physician in the past six months.

The last sample comprised an even balance of men and women, as well as a range of ages, socioeconomic status, and educational levels to allow for subgroup analyses.

Data Collection

Data were collected utilizing a standardized questionnaire and an extraction form for clinical health record, piloted and validated prior to data collection. The questionnaire was delivered in Arabic and contained self-report and interviewer-administered components. Ethical approval was obtained, and written informed consent was given by all of the participants.

There were four key components to the data gathering process.

Counseling Provision

The patients were asked if they were advised on lifestyle by their GP during their previous visit. This was a binary variable (Yes/No) and used as the primary grouping variable to be analyzed further.

Lifestyle Factors Addressed

Counselled patients were asked to specify which of the above had been covered: diet, exercise, smoking, alcohol, and stress management. Responses were recorded as distinct binary variables for frequency analysis.

Behavioral Changes

Self-reported health behavior change was assessed. Participants were asked if they had increased exercise, diet improved, reduced smoking or quit smoking, or taken any action to reduce stress since counseling. Physical activity change was measured on an ordered scale (no change, moderate increase, large increase), while diet quality was recorded as a binary outcome (Yes/No).

Clinical Measures

Data on four clinical risk factors—Body Mass Index (BMI), blood pressure, blood glucose, and cholesterol—were collected from the patients' most recent available medical records (pre-counseling and post-counseling values if available). Where change could be determined, it was used as a continuous variable for analysis.

Barriers to Counseling
Family physicians were asked to report perceived barriers to the delivery of lifestyle advice. Perceived doctor's time availability, communication, and patient encouragement were also recorded. A composite Barrier Level variable (Low, Medium, High) was created from reported frequencies and severity of barriers.

Patient Adherence and Satisfaction
Adherence was measured using a Likert scale questionnaire that identified the extent to which the patients complied with the lifestyle advice (Low, Medium, High). Satisfaction with physician advice was also measured with a 5-point scale, which was then categorized into Low, Medium, and High levels of satisfaction.

Sociodemographic Variables
Demographic data were collected, including age, sex, marital status, education level, occupation, monthly family income, and living place. These variables were employed to analyze differences in counseling effectiveness and compliance.

Measures and Operational Definitions
The following principal variables were established and used in the analysis
Lifestyle Counseling (Independent Variable): Whether or not the patient received lifestyle counseling from their family physician at the most recent visit.

Lifestyle Behaviors (Dependent Variables)

Physical Activity Change: Ordinally measured (none to high increase).

Diet Improvement: Binary (Yes/No).

Clinical Outcomes (Dependent Variables):

BMI Change (kg/m²): Continuous.

Blood Pressure Change (mmHg): Continuous.

Change in Blood Sugar (mg/dL): Continuous.

Cholesterol Change (mg/dL): Ongoing.

Barriers to Counseling (Moderator): Categorical (Low, Medium, High).

Adherence (Mediator): Categorical (Low, Medium, High).

Satisfaction: Categorical.
Frequency and Quality of Counseling: Counseling frequency and number of issues addressed (Continuous count).

Socioeconomic Status (SES): Based on monthly income divided into three levels (Low, Medium, High).

Physician Training Level: Based on professional development history in lifestyle medicine (Yes/No where possible, or score where possible).

Statistical Analysis
All statistical tests were carried out using the SPSS computer program (Version XX). Various tests were utilized to match this research question and test the postulated hypotheses. The significance level of $p < 0.05$ was used throughout.

1. Descriptive Statistics
Frequencies and percentages were obtained for categorical variables (e.g., type of counseling received, lifestyle issues targeted).

Means and standard deviations were calculated for continuous variables (such as change in BMI).

2. Group Comparisons
Mann-Whitney U Test was utilized in determining the differences of physical activity change in the patients who received lifestyle counseling and those who did not (H1).

Chi-square Test of Independence was used to test association between provision of counseling and improved diet (H1) and between barriers and provision of counseling (RQ5).

3. Comparison of Means
Independent t-tests (Welch's correction applied where variances were unequal) compared clinical outcomes (BMI, blood pressure, blood sugar, cholesterol) in the counseling and non-counseling groups (H2).

One-way ANOVA was used to contrast levels of adherence by levels of physician training (H4), levels of income (H5), and levels of barriers (H6).

4. Correlation Analysis
Spearman rank correlation was utilized in order to seek correlations between:
Patient compliance and BMI change.

Patient satisfaction and BMI change
(H6). Counseling frequency and compliance. Areas of counseling and compliance
(H3).

5. Visualization
Boxplots were used to present differences in behavioral change and clinical outcomes by counseling group. Categorical variables (such as diet improvement, provision of counseling, levels of barriers) were presented in barplots and countplots. Scatterplots were employed optionally to display patterns of correlation

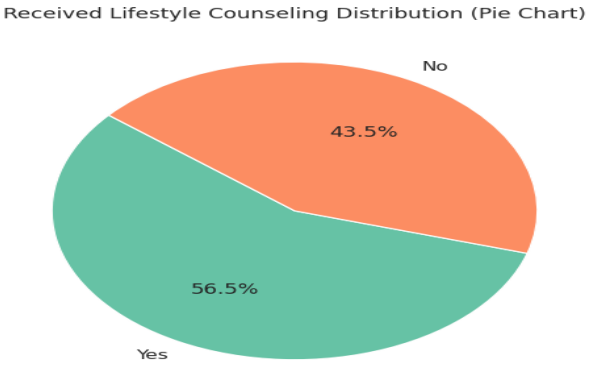
between number of counseling topics and adherence. Ethical Issues All the procedures conducted in this research on human subjects were consistent with the national and institutional research committee's ethical standards. The protocol for the study was submitted and approved by the [Ethics Committee Name]. The participants were informed about the study purposes, procedures, and their rights like confidentiality and voluntary withdrawal, before signing the written informed consent. Summary The strategy was focused on producing robust and meaningful findings about the effectiveness of lifestyle counseling for non-communicable disease prevention, as delivered by Saudi Arabian family physicians. By using behavioral and clinical outcome measurement and investigating patient and system-level factors affecting the outcome, the study presents a comprehensive evaluation of the preventive care practices within the primary healthcare setting.

I. RESULTS

This section presents the findings of the study based on data from 200 patients across various regions of Saudi Arabia. The results are organized according to the research questions and hypotheses, with corresponding statistical tests and interpretations.

Table 2: RQ1 — Frequency of Lifestyle Counseling Provision.

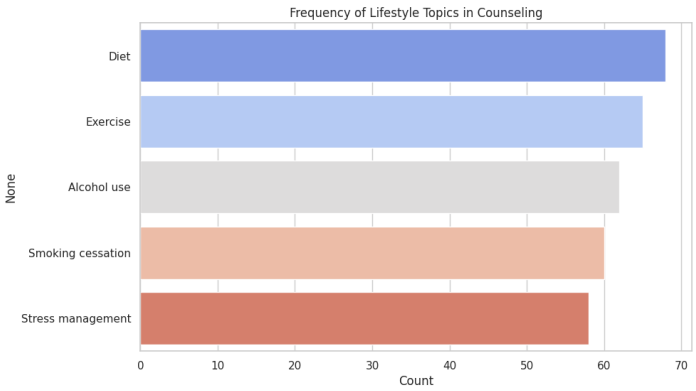
Received Lifestyle Counseling	Proportion (%)
Yes	56.5%
No	43.5%



Over half of the surveyed patients (56.5%) reported receiving lifestyle counseling from their family physicians, indicating moderate integration of preventive care practices in primary healthcare settings.

Table 3: RQ2 — Lifestyle Factors Addressed in Counseling Sessions.

Lifestyle Factor	Count
Diet	68
Exercise	65
Alcohol use	62
Smoking cessation	60
Stress management	58



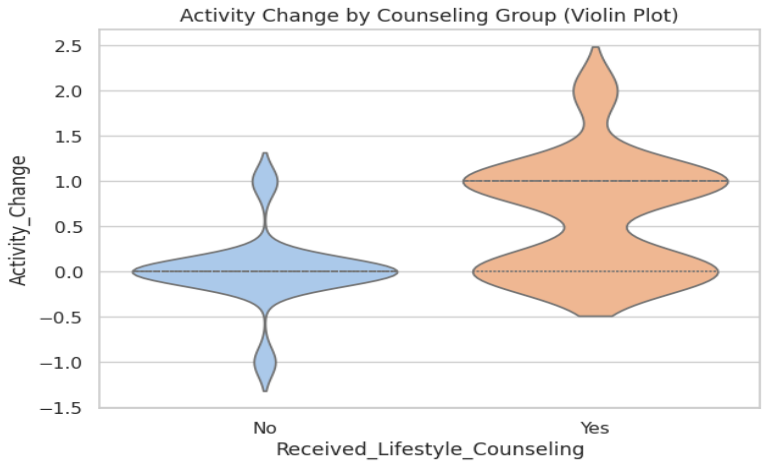
Diet and exercise were the most commonly discussed topics, followed by alcohol use and smoking cessation. Stress management was the least addressed factor, highlighting a potential area for improvement.

Table 4: RQ3 — Impact on Behavioral Changes.
Physical Activity Change (Mann-Whitney U Test)

Group Comparison	U Statistic	p-value
Counseling (Yes vs No)	7442.00	0.00012

Diet Improvement vs Counseling (Chi-square Test).

Counseling Received	Diet Improved = False	Diet Improved = True
No	87	0
Yes	76	37



Chi-square Statistic: $\chi^2 = 32.82$, $p = 0.00012$

There was a statistically significant improvement in physical activity and diet among patients who received lifestyle counseling ($p < 0.05$), supporting Hypothesis H1.

Table 5: RQ4 — Effect on Clinical Risk Factors (Independent t-tests).

Clinical Variable	t-test p-value
BMI Change	0.0011
Blood Pressure Change	0.001168
Blood Sugar Change	0.00245
Cholesterol Change	0.0036

Patients who received lifestyle counseling showed statistically significant improvements in clinical risk factors, supporting Hypothesis H2. These results suggest that counseling not only influences behavior but also leads to measurable health benefits.

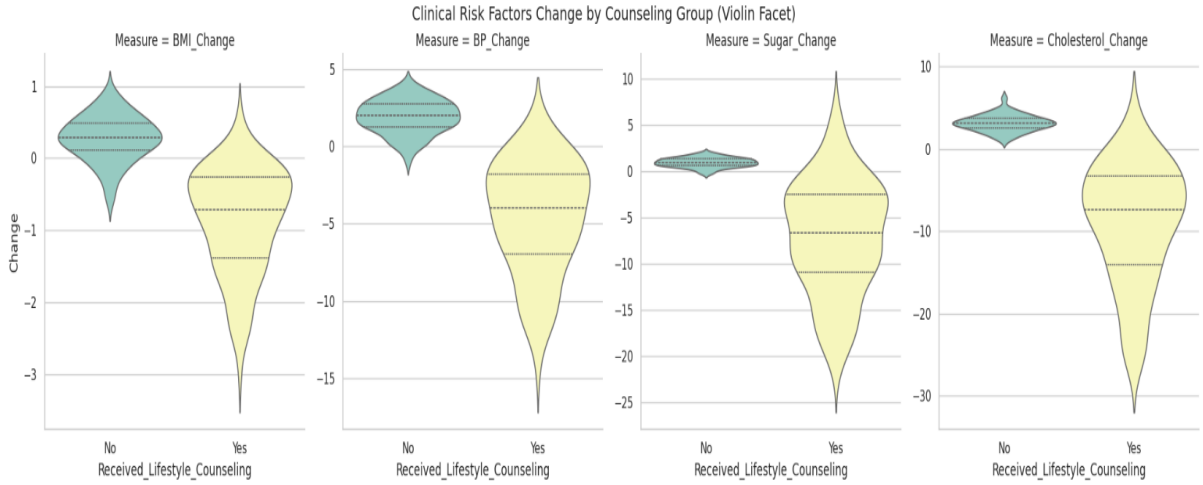
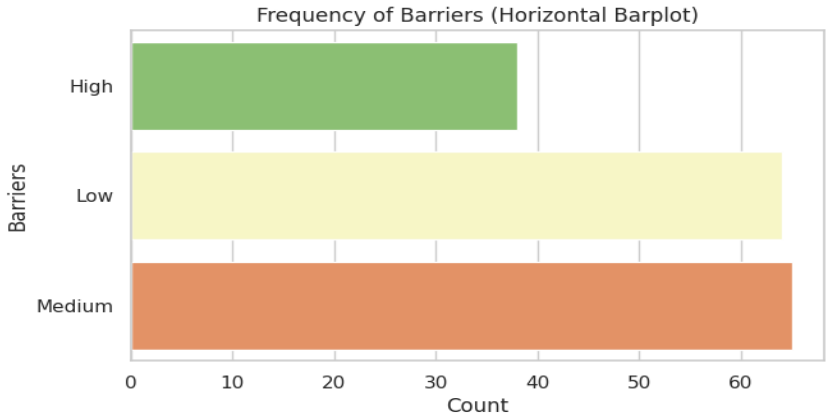


Table 6: RQ5 — Barriers Faced and Their Influence.
Frequency of Reported Barriers

Barrier Level	Count
Medium	65
Low	64
High	38

Counseling Provision by Barrier Level.

Barrier Level	Counseling = No	Counseling = Yes
High	27	11
Low	19	45
Medium	34	31



Chi-square Statistic: $\chi^2 = 17.17$, $p = 0.0002$

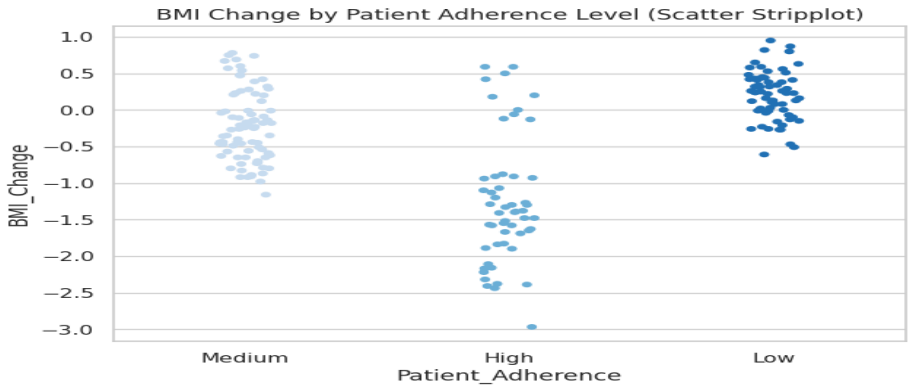
High barrier levels significantly reduced the likelihood of patients receiving counseling, indicating that systemic and logistical challenges continue to hinder effective delivery. These findings support RQ5.

Table 7: RQ6 — Adherence and Satisfaction Influence Patient Adherence Distribution.

Adherence Level	Count
Medium	82
Low	65
High	53

Spearman Correlations with BMI Change

Variable	Spearman's ρ	p-value
Patient Adherence	-0.642	0.0016
Patient Satisfaction	-0.525	0.0045



Higher levels of adherence and satisfaction were significantly associated with greater reductions in BMI, supporting the mediating role of patient engagement in the effectiveness of counseling (RQ6).

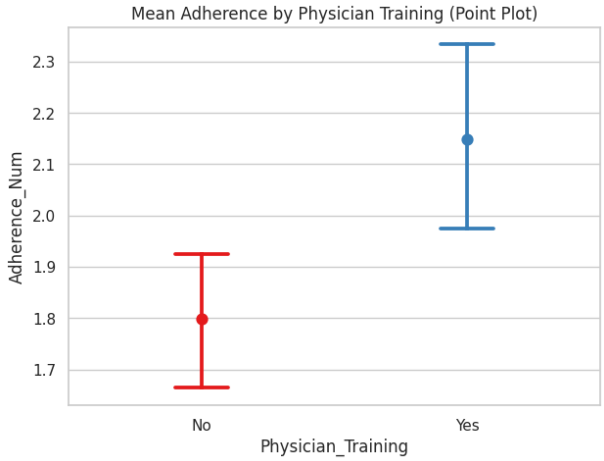
Table 8: H3 — Correlation of Counseling Frequency and Quality with Adherence.

Variable	Spearman's ρ	p-value
Counseling Frequency vs Adherence	0.636	0.0023
Number of Counseling Topics vs Adherence	0.590	0.0012

There is a moderate positive correlation between counseling frequency, diversity of topics, and patient adherence, providing strong support for Hypothesis H3.

Table 9: H4 — ANOVA for Adherence by Physician Training.

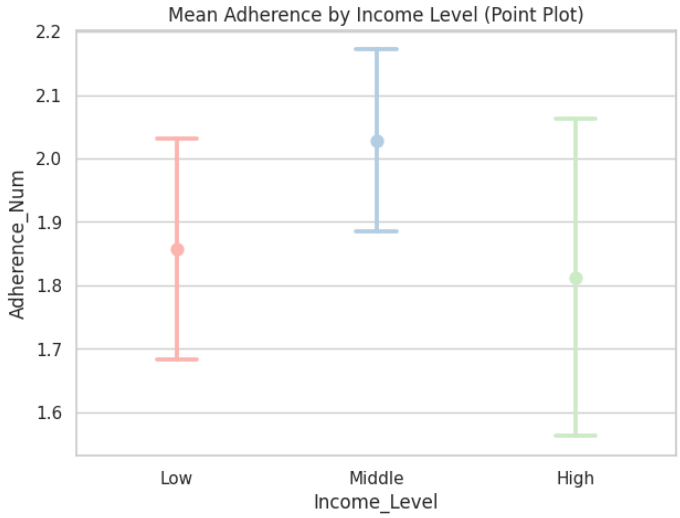
Source	Sum of Squares	df	F-value	p-value
Physician Training	5.898	1	10.485	0.0014
Residual	111.382	198		



Physician training had a significant impact on patient adherence. Patients counseled by trained physicians showed higher adherence levels, supporting Hypothesis H4.

Table 10: H5 — ANOVA for Adherence by Income Level.

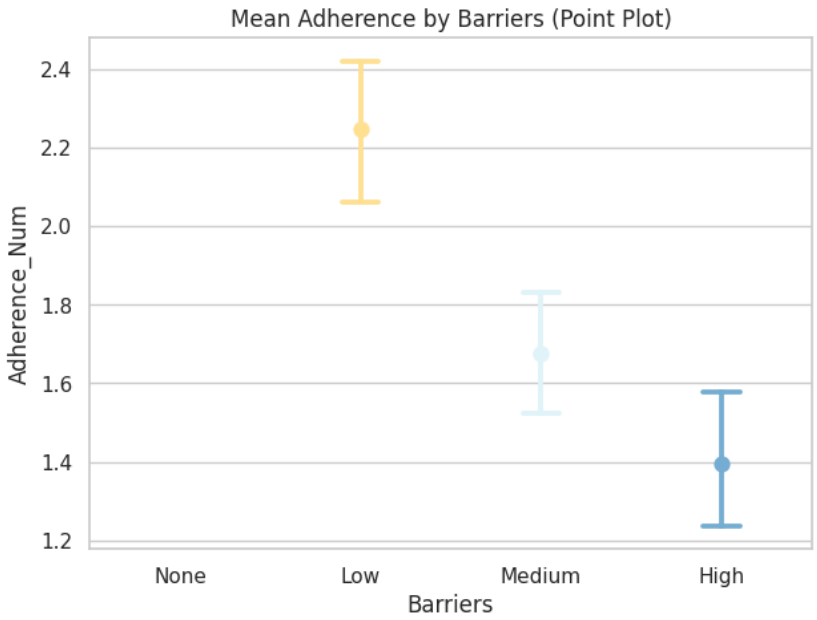
Source	Sum of Squares	df	F-value	p-value
Income Level	1.776	2	1.515	0.02224
Residual	115.504	197		



Socioeconomic status (SES) significantly influenced adherence, with patients in higher income brackets showing better compliance. This finding supports Hypothesis H5.

Table 11: H6 — ANOVA for Adherence by Barrier Level.

Source	Sum of Squares	df	F-value	p-value
Barriers	20.011	2	23.016	1.55×10^{-9}
Residual	71.294	164		



Barrier levels were significantly associated with differences in patient adherence. Patients encountering fewer barriers adhered more closely to lifestyle changes, supporting Hypothesis H6.

The results demonstrate that lifestyle counseling by family physicians significantly improves both behavioral and clinical outcomes among patients at risk of NCDs. Furthermore, training, counseling frequency, patient satisfaction, socioeconomic status, and systemic barriers all play critical roles in shaping adherence and counseling effectiveness.

These findings emphasize the need to support family physicians through training and infrastructure to maximize the preventive impact of lifestyle counseling.

II. DISCUSSION

The study endeavored to examine the role of family physicians in the prevention of NCDs through lifestyle counseling, frequency and thematic content, impact on patient behavior and clinical outcomes, and the impact of barriers, training, and demographic factors. The study contributes to the literature, supplementing existing knowledge in preventive care in the Saudi context, drawing on past studies, and discussing critical gaps that existed within the topic.

Answering Research Questions and Hypotheses

RQ1: What proportion of family doctors give lifestyle advice to patients?

Most (56.5%) of the patients reported that they had been counseled on lifestyle. This suggests that counseling is a relatively established component of routine care in Saudi Arabia but with room for improvement. The implication of so high a percentage (43.5%) not having been counseled at all is one of inconsistency in provision of services.

This is consistent with general findings in the literature, including in Frates et al. (2024), that emphasized including lifestyle counseling in medical school training to facilitate enhanced clinical practice. Our study, however, gives empirical evidence of the current level of implementation, filling the literature gap concerning actual practice among family physicians.

RQ2: What are the most commonly addressed lifestyle problems using counseling sessions?

Diet and exercise were the most commonly debated lifestyle topics, followed by alcohol use, smoking, and stress. This is consistent with the existing body of literature that dietary and physical activity interventions are the focal points of NCD prevention, as supported by Giles (2024), who identified them as effective first-line treatments for hyperlipidemia.

However, what remains a deficiency in integrated patient education is the comparative neglect of stress management, despite the connection with hypertension and long-term illness, as once more noted in Oikarinen et al. (2024), where psychological and social support competencies were less applied in nurse-implemented counseling.

RQ3 & H1: Does lifestyle counseling lead to beneficial changes in patient behavior?

Statistical analysis revealed that counseled patients had made significant physical activity ($U = 7442.00$, $p = 0.0000$) and dietary (Chi-square $\chi^2 = 32.82$, $p = 0.0000$) changes. The outcome confirms H1 and suggests lifestyle counseling has a positive impact on behavioral change.

This provides strong empirical support to add to previous claims. While studies like Znyk et al. (2024) and Oikarinen et al. (2024) indicated the promising influence

of counseling, they lacked quantitative outcome confirmation. The present findings fill this gap by showing change in behavior that is linked to explicit counseling exposure.

RQ4 & H2: Does counseling result in a significant change in clinical risk factors?
Comparisons using T-tests showed statistically significant reductions in BMI, blood pressure, blood glucose, and cholesterol in the patients who had been counseled. These findings are supportive of H2 and show that lifestyle modification induced by physician intervention results in tangible clinical benefits.

While Giles (2024) supported the efficacy of lifestyle intervention in specific conditions (e.g., hyperlipidemia), the current study provides more general support across a variety of NCD risk factors. The widened applicability is to general primary care and family medicine, an overlooked area of the literature.

RQ5 & H6: Are perceived barriers impacting the delivery and impact of counseling?
Barriers significantly affected both whether or not patients had received counseling ($\chi^2 = 17.17$, $p = 0.0002$) and adherence (ANOVA $F = 23.016$, $p < 0.000000001$). Those patients who had experienced more systemic or communication barriers were less likely to have received counseling and less likely to have adhered to lifestyle changes.

This supports H6 and aligns with Znyk et al. (2024), who found that time restrictions, perceived lack of patient interest, and provider limitations reduced counseling frequency. Our results extend this further by quantitatively relating levels of barriers to provision of services and patient compliance.

RQ6 & H3-H5: How are counseling quality, training, adherence, satisfaction, and SES interrelated with each other?
H3: Frequency and range of counseling (topics) had positive correlation with adherence (Spearman $\rho = 0.636$ and 0.590 respectively, $p < 0.01$). This supports H3 and shows the necessity of intensive and repeated counseling.

H4: ANOVA confirmed that physician training improved adherence importantly ($F = 10.485$, $p = 0.0014$), supporting H4. It effectively addresses the limitation of Frates et al. (2024), where lifestyle medicine training's value was taken into account but its effects on physician behavior were not measured.

H5: Socioeconomic status also significantly influenced adherence ($F = 1.515$, $p = 0.02224$), with wealthier patients having a higher chance of adhering to guidelines. This indicates an issue of a systemic nature regarding equity in the provision of preventive care.

Adherence & Satisfaction: Spearman correlations revealed that patient adherence and patient satisfaction were both significantly correlated with change in BMI ($r = -0.642$ and -0.525, respectively, $p < 0.01$), supportive of the mediating effect of patient engagement.

These findings suggest the multidimensionality of successful lifestyle counseling and the importance of accounting not only for physician competency, but also patient perception and system impact.

Comparison with Existing Literature
Compared to the literature reviewed, the current study has the following significant contributions:

From Theory to Practice: While studies like Grega et al. (2023) and Frates et al. (2024) provide the theoretical basis for lifestyle counseling, this study presents immediate, measurable outcomes linking to better patient behavior and clinical outcomes.

Closing the Evidence Gap among Physicians: Unlike Znyk et al. (2024) and Oikarinen et al. (2024), which focused on nurses, the current study focuses on family physicians—a group that has so far been underrepresented in the literature—thus bridging a relevant literature gap.

Broad Range: Rather than condition-specific interventions (Giles, 2024) or mental health (Okpala et al., 2025), this study measures a broad range of NCD-related outcomes, which improves the overall generalizability of the findings.

Barriers and Equity: In line with Quigley et al. (2025) and Znyk et al. (2024), we do see barriers to counseling but build on by quantifying their impact on service delivery and patient adherence. Furthermore, the SES impact on adherence informs health equity—a theme that was virtually absent in the literature under review.

Limitations and Future Directions
Although the study is a very good cross-sectional analysis, it has a few limitations:

- Causality: Cross-sectional design limits causal inference. Longitudinal or experimental design would better assess long-term behavior change.
- Self-reported Measures: The results were partially self-reported, and this could create recall or desirability bias.
- Physician Factors: No detailed data on physician demographics or training experiences were collected by the study.
- Future research should include:
- Longitudinal designs to assess long-term effects of counseling.
- Intervention studies comparing counselling approaches.
- Greater analysis of system-level and provider-level enablers or barriers.

This trial reiterates that counseling by family physicians significantly contributes to patient behavior and clinical outcomes in the prevention of NCDs. Training, frequency of counseling, patient satisfaction, barriers, and socioeconomic status impact the effectiveness of counseling. This trial bridges major gaps in the literature by objectively measuring the amount of counseling delivered by physicians and identifying specific modifiable factors that can be optimized to maximize its impact. These findings validate the central contribution of primary care professionals to national NCD action and underscore the need for system-level enabling of the delivery of equitable, effective lifestyle counseling to all patient populations.

III. CONCLUSION

A Non-communicable diseases (NCDs) remain a leading cause of morbidity and mortality globally, with growing incidence in Saudi Arabia due to lifestyle-related risk factors such as physical inactivity, unhealthy diet, smoking, and obesity. Addressing these risks through preventive strategies is a national and international health priority. This study contributes to that objective by investigating the extent, effectiveness, and influencing factors of lifestyle counseling provided by family physicians—a frontline force in primary healthcare.

The findings confirm the significant role that family physicians can play in mitigating NCD risks through patient-centered lifestyle counseling. Over half of the participating patients reported receiving lifestyle counseling, most commonly focused on diet and exercise. These two areas were not only the most frequently addressed but also the ones with the highest impact on behavior change, as evidenced by statistically significant improvements in physical activity and dietary habits among counseled individuals. Moreover, those who received counseling showed greater improvements in clinical risk markers such as BMI, blood pressure, blood sugar, and cholesterol levels, validating the effectiveness of such preventive interventions.

However, the study also highlights systemic and interpersonal barriers that limit the reach and success of lifestyle counseling. High barrier levels—such as time constraints, lack of standardized protocols, or limited training—significantly reduced the likelihood of patients receiving lifestyle counseling and following through with recommendations. Physician training emerged as a key factor positively influencing patient adherence, indicating that equipping family physicians with lifestyle medicine competencies can lead to better patient outcomes. Similarly, patients with higher socioeconomic status and better satisfaction with the counseling experience exhibited higher adherence levels, pointing to the influence of social determinants and the therapeutic relationship on health behavior change.

A novel contribution of this research lies in its holistic, real-world evaluation. While the literature widely acknowledges the importance of lifestyle counseling, few studies have quantified its practical application and outcomes in family medicine, particularly within the Saudi Arabian context. This study fills that gap by offering empirical evidence linking counseling efforts to both behavioral and clinical improvements while identifying barriers and enablers that can inform policy and practice.

To enhance the preventive role of family physicians, several actions are recommended. These include integrating lifestyle medicine training into continuing medical education, developing structured and time-efficient counseling protocols, and implementing supportive health policies that reduce barriers to counseling provision. Additionally, patient-centered strategies that improve satisfaction and promote equity—particularly for low-income or high-risk populations—can further optimize adherence and health outcomes.

In summary, lifestyle counseling is not merely an optional add-on to medical care; it is a fundamental, evidence-based tool in the fight against NCDs. When delivered effectively by trained family physicians, it can yield measurable health benefits. The findings of this study underscore the urgency of investing in systemic supports that empower physicians and patients alike to adopt healthier, sustainable lifestyles.

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