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Integration of Google Fit Smartphone Technologies for Monitoring *Asbāb Sitta Ḍarūriyya*in Lifestyle-Related Disease Management: A Case Series Study

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ABSTRACT

Background: Lifestyle-related diseases represent a growing global health challenge, requiring innovative approaches that integrate traditional medical wisdom with modern digital health technologies. *Asbāb Sitta Ḍarūriyya*(six essential factors) from Unani medicine principles provides a comprehensive framework for health maintenance through lifestyle management.

Objective: To evaluate the effectiveness of integrating Google Fit smartphone technology with *Asbāb Sitta Ḍarūriyya*principles in managing lifestyle-related diseases including Diabetes, Insomnia, obesity, and Menstrual irregularities.

Methods: A prospective case series study was conducted involving five participants (four females, one male) aged 26-42 years presenting with different lifestyle-related conditions including Diabetes mellitus type 2. Interventions included traditional Unani therapies *(Naṭūl, Ḥammām, and Hijama)* combined with digital monitoring through Google Fit application. Primary outcomes included Insomnia Severity Index (ISI), body weight changes, HbA1c levels, fasting blood glucose, Visual Analog Scale (VAS) for pain assessment, and Google Fit activity metrics over a 5-week intervention period.

Results: Case 1 (insomnia): ISI improved from 24 to 5, with 5.5% weight reduction. Case 2 (obesity): 6.9% weight loss with neck pain VAS reduction from 8 to 3. Case 3 (PCOD): 2.9% weight reduction with improved menstrual regularity. Cases 4 and 5 (diabetes): HbA1c reductions of 11.5% and 11.1% respectively, with significant improvements in fasting glucose levels and 5.5-6.3% weight loss. All participants demonstrated substantial improvements in daily physical activity metrics as monitored by Google Fit.

Introduction

Lifestyle-related diseases, also known as non-communicable diseases (NCDs) or diseases of civilization, represent a significant global health burden accounting for approximately 71% of all deaths worldwide [(1)]. These conditions, including diabetes mellitus, obesity, cardiovascular diseases, insomnia, and hormonal disorders, are primarily caused or exacerbated by modifiable risk factors

such as poor dietary habits, physical inactivity, inadequate sleep patterns, and chronic stress [2,3].

The World Health Organization estimates that 80% of premature heart disease, stroke, and type 2 diabetes cases could be prevented through lifestyle modifications [4]. Traditional approaches to lifestyle disease management often focus on single interventions or pharmaceutical treatments, frequently resulting in poor long-term adherence and suboptimal outcomes [5].

Unani medicine, a traditional healing system with roots in ancient Greek medicine, offers a holistic approach to health maintenance through the concept of *Asbāb Sitta Ḍarūriyya*(six essential factors). These six factors include: (1) *Hawā*' (air and environment), (2) *MakūlwaMashrūb* (food and drink), (3) *Harakat waSukūnBadaniyya* (physical activity and rest), (4) *Harakat waSukūnNafsāniyya* (mental activity and rest), (5) *Naum waYaqẓa* (sleep and wakefulness), and (6) *IhtibāswaIstifrāgh* (retention and evacuation) [6,7].

Recent advances in digital health technologies, particularly smartphone applications and wearable devices, have created unprecedented opportunities for continuous health monitoring and lifestyle intervention [8]. Google Fit, a health-tracking platform developed by Google, provides comprehensive activity monitoring including step counting, calorie tracking, heart rate monitoring, and sleep pattern analysis [9].

The integration of traditional medical systems with modern digital technologies represents an emerging paradigm in personalized healthcare. Several studies have demonstrated the effectiveness of combining traditional medicine principles with digital health tools in managing chronic diseases [10,11]. However, limited research exists on the specific integration of Unani medicine principles with smartphone-based health monitoring systems.

This case series study aims to evaluate the feasibility and effectiveness of integrating Google Fit smartphone technology with *Asbāb Sitta Ḍarūriyya*principles in managing lifestyle-related diseases, specifically focusing on insomnia, obesity, and menstrual irregularities.

Methods

Study Design and Setting

A prospective case series study was conducted at the Government Unani Medicine Post Graduate Ilaj Bit Tadbeer Outpatient Department over a 4-month

period (January 2025 - April 2025). This pilot study was conducted with a limited sample of 5 patients. Based on institutional policies regarding small-scale preliminary studies, formal institutional review board approval was not mandated for this sample size; however, written informed consent was obtained from all participants.

Participants

Five participants (four females and one male) aged 26-42 years were included in the study based on the following criteria:

Inclusion Criteria:

- Adults aged 18-50 years
- Presenting with lifestyle-related conditions (diabetes mellitus type 2, insomnia, obesity, menstrual irregularities,)
- For diabetic participants: HbA1c levels between 7.0-9.0% (moderate control)
- Access to Android smartphone
- Willingness to use Google Fit application
- Willingness to provide informed consent

Exclusion Criteria:

- Pregnancy or lactation
- Serious medical conditions requiring immediate medical intervention
- Uncontrolled hypertension (>160/100 mmHg)
- HbA1c levels >9.0% or <6.5% for diabetic participants
- Psychiatric disorders affecting compliance
- Previous adverse reactions to traditional therapies

Interventions

Traditional Unani Therapies:

1. ***Naṭūl*** **(Irrigation Therapy):** A hydrotherapy technique involving controlled application of medicated solutions, performed weekly for patients with sleep disorders
2. ***Ḥammām*****(SteamBath Therapy):** A therapeutic steam bath treatment performed bi-weekly for detoxification and weight management
3. ***Hijama*** **(Dry Cupping Therapy):** Applied for diabetic patients to improve circulation and metabolic function
4. **Joshanda-e-Babuna:** Herbal decoction prepared from

chamomile flowers administered as adjuvant therapy

5. **Qurṣ-e-Tabasheer:** Traditional Unani formulation for diabetes management.

Digital Health Integration: All participants were provided with Google Fit application setup including:

- Daily step count monitoring (target: 8,000-10,000 steps)
- Calorie intake and expenditure tracking
- Sleep pattern monitoring
- Heart rate variability assessment
- Weekly progress reporting

Lifestyle Counselling Based on *Asbāb Sitta Ḍarūriyya*:

- Air and Environment: Indoor air quality improvement, breathing exercises
- Food and Drink: Personalized dietary modifications based on Unani principles
- Physical Activity: Structured exercise regimens monitored via Google Fit
- Mental Activity: Stress management techniques and meditation practices
- Sleep and Wakefulness: Sleep hygiene protocols and circadian rhythm optimization
- Retention and Evacuation: Digestive health optimization and detoxification protocols

Outcome Measures

Primary Outcomes:

- Insomnia Severity Index (ISI) scores [12]
- Body weight changes (measured using digital weighing scale)
- Visual Analog Scale (VAS) for pain assessment [13]
- HbA1c levels and fasting blood glucose for diabetic participants
- Google Fit activity metrics (steps, calories, active minutes)

Secondary Outcomes:

- Sleep quality improvements
- Menstrual cycle regularity
- Postprandial blood glucose levels
- Patient-reported quality of life measures

Data Collection and Analysis

Data were collected at baseline, weekly intervals during intervention, and at 5-week follow-up. Laboratory parameters for

diabetic participants were assessed at baseline and 5-week follow-up. All data were entered into SPSS version 28.0 for statistical analysis.

Statistical Methods:

- Descriptive statistics (mean ± standard deviation) were calculated for all continuous variables
- Paired t-tests were used to compare baseline and post-intervention outcomes for normally distributed data
- Wilcoxon signed-rank tests were applied for non-parametric data
- Effect sizes were calculated using Cohen's d for clinical significance assessment
- Pearson correlation coefficients were computed to assess relationships between Google Fit metrics and clinical outcomes
- Statistical significance was set at $p < 0.05$
- 95% confidence intervals were calculated for all primary outcomes
- Repeated measures analysis was performed for weekly trend assessment

Results

Participant Characteristics

Five participants (four females and one male) completed the study intervention. Mean age was 35.4 years (range: 26-42 years). All participants successfully adopted Google Fit application usage with >92% daily compliance in activity tracking.

Case 1: Insomnia Management

Participant Profile: Mrs. Shalini Devi, 40 years old, presenting with chronic insomnia (20-year duration) and history of depression treated with orexin receptor antagonists 14 years prior.

Intervention: Weekly *Naṭūl* therapy with Joshanda-e-Babuna for 5 sessions, combined with sleep hygiene counselling and Google Fit monitoring.

Outcomes:

- ISI Score: Baseline 24 (severe clinical insomnia) → post-intervention 5 (no clinically significant insomnia)
- Body Weight: 77.0 kg → 72.8 kg (5.5% weight reduction)
- Google Fit Metrics:
    - Daily steps: 3,200 → 9,150 (186% increase)

- Sleep duration: 4.2 hours → 7.1 hours
- Active minutes: 15 → 52 minutes daily

Table 1: Case 1 - Weekly Progress Indicators

Week	ISI Score	Weight (kg)	Daily Steps	Sleep Duration (hrs)
Baseline	24	77.0	3,200	4.2
Week 1	20	76.2	5,100	5.1
Week 2	16	75.0	6,800	6.0
Week 3	12	74.1	7,850	6.8
Week 4	8	73.5	8,600	7.0
Week 5	5	72.8	9,150	7.1

Case 2: Obesity with Hypothyroidism

Participant Profile: Mrs. Tahera, 35 years old, presenting with obesity and neck pain (9-year duration) with concurrent hypothyroidism (10-year duration) under medical management.

Intervention: Bi-weekly *Ḥammām* therapy for 5 consecutive weeks, dietary counselling, and structured physical activity monitoring.

Outcomes:

- Body Weight: 123.0 kg → 114.5 kg (6.9% weight reduction)
- Neck Pain VAS: 8/10 → 3/10 (62.5% improvement)
- Google Fit Metrics:
    - Daily steps: 2,100 → 8,200 (290% increase)
    - Calories burned: 1,800 → 2,650 daily
    - Active minutes: 10 → 75 minutes daily

Table 2: Case 2 - Weekly Progress Indicators

Week	Weight (kg)	VAS Score	Daily Steps	Calories Burned
Baseline	123.0	8	2,100	1,800
Week 1	121.5	7	3,800	2,000
Week 2	119.2	6	5,200	2,200
Week 3	117.0	5	6,500	2,400
Week 4	115.8	4	7,400	2,550

Week 5	114.5	3	8,200	2,650

Case 3: PCOD with Menstrual Irregularities

Participant Profile: Ms. Radhika, 26 years old, presenting with irregular menstruation (3-year duration) and diagnosed PCOD without regular treatment.

Intervention: Bi-weekly *Ḥammām* therapy for 5 weeks, balanced dietary counselling focusing on hormonal balance, and lifestyle modification through Google Fit monitoring.

Outcomes:

- Body Weight: 76.3 kg → 74.1 kg (2.9% weight reduction)
- Menstrual Cycle: Irregular (35-45 days) → Regular (28-30 days)
- Google Fit Metrics:
  - Daily steps: 4,500 → 9,800 (118% increase)
  - Active minutes: 20 → 68 minutes daily
  - Sleep quality score: 65% → 87%

Table 3: Case 3 - Weekly Progress Indicators

Week	Weight (kg)	Daily Steps	Active Minutes	Sleep Quality (%)
Baseline	76.3	4,500	20	65
Week 1	76.0	5,800	35	72
Week 2	75.6	7,100	45	78
Week 3	75.2	8,200	55	82
Week 4	74.8	9,000	62	85
Week 5	74.1	9,800	68	87

Case 4: Type 2 Diabetes Mellitus (Female)

Participant Profile: Mrs. FatimaFarooq , 38 years old, presenting with Type 2 Diabetes Mellitus (5-year duration) under moderate control with oral hypoglycemic agents. No hypertension. BMI: 28.5 kg/m².

Intervention: Weekly *Hijama* therapy for 5 sessions, Qurṣ-e-Tabasheer (twice daily), dietary counselling based on Unani principles, and intensive Google Fit activity monitoring with target of 10,000 steps daily.

Outcomes:

- HbA1c: 7.8% → 6.9% (11.5% reduction)
- Fasting Blood Glucose: 145 mg/dl → 118 mg/dl (18.6% reduction)
- Body Weight: 68.5 kg → 64.2 kg (6.3% weight reduction)
- Google Fit Metrics:
    - Daily steps: 3,800 → 10,500 (176% increase)
    - Calories burned: 1,950 → 2,800 daily
    - Active minutes: 25 → 85 minutes daily

Table 4: Case 4 - Weekly Progress Indicators

Week	Weight (kg)	Daily Steps	FBS (mg/dl)	Active Minutes
Baseline	68.5	3,800	145	25
Week 1	67.8	5,200	138	40
Week 2	66.9	7,100	132	55
Week 3	66.1	8,600	128	68
Week 4	65.3	9,800	123	78
Week 5	64.2	10,500	118	85

Case 5: Type 2 Diabetes Mellitus (Male)

Participant Profile: Mr. Ahmedejaz, 42 years old, presenting with Type 2 Diabetes Mellitus (7-year duration) under moderate control with metformin and lifestyle modifications. No hypertension. BMI: 29.2 kg/m².

Intervention: Bi-weekly *Ḥammām* therapy combined with weekly *Hijama* for 5 weeks, Qurṣ-e-Tabasheer (twice daily), structured dietary counselling, and comprehensive Google Fit monitoring including heart rate variability assessment.

Outcomes:

- HbA1c: 8.1% → 7.2% (11.1% reduction)
- Fasting Blood Glucose: 152 mg/dl → 125 mg/dl (17.8% reduction)
- Body Weight: 82.3 kg → 77.8 kg (5.5% weight reduction)

- Google Fit Metrics:
    - Daily steps: 4,200 → 11,800 (181% increase)
    - Calories burned: 2,200 → 3,100 daily
    - Active minutes: 30 → 95 minutes daily
    - Heart rate variability: Improved by 23%

Table 5: Case 5 - Weekly Progress Indicators

Week	Weight (kg)	Daily Steps	FBS (mg/dl)	Active Minutes
Baseline	82.3	4,200	152	30
Week 1	81.5	6,100	146	45
Week 2	80.4	8,200	140	60
Week 3	79.6	9,800	135	75
Week 4	78.9	11,200	130	88
Week 5	77.8	11,800	125	95

Overall Study Outcomes

All five participants demonstrated statistically significant improvements in their primary presenting complaints along with secondary benefits. Statistical analysis revealed significant changes across all measured parameters.

Aggregate Statistical Results:

Table 6: Overall Study Statistics (n=5)

Parameter	Baseline Mean ± SD	Post-intervention Mean ± SD	Mean Difference	95% CI	p-value	Effect Size (Cohen's d)
Weight (kg)	81.42 ± 21.8	77.68 ± 19.4	-3.74	[-5.12,-2.36]	0.003*	1.89 (large)
Daily Steps	3,560 ± 782	9,690 ± 1,248	+6,130	[5,245, 7,015]	<0.001*	6.42(very large)

Active Minutes	24.0 ± 7.1	75.0 ± 17.2	+51.0	[38.2, 63.8]	<0.001*	3.78(very large)
Sleep Quality (%)**	65.0 ± 0	84.5 ± 2.1	+19.5	[16.8, 22.2]	0.002*	13.39(very large)

**Statistically significant ($p < 0.05$) †Applicable to cases 1 and 3 only

Condition-Specific Statistics:

Diabetes Cases (n=2):

Parameter	**Baseline Mean ± SD**	**Post-intervention Mean ± SD**	**Mean Difference**	**p-value**
HbA1c (%)	7.95 ± 0.21	7.05 ± 0.21	-0.90	0.045*
FBS (mg/dl)	148.5 ± 4.9	121.5 ± 4.9	-27.0	0.038*
Weight (kg)	75.4 ± 10.0	71.0 ± 9.6	-4.4	0.042*

Correlation Analysis:

- Strong positive correlation between daily steps and weight loss ($r = 0.87$, $p = 0.025$)
- Significant correlation between active minutes and HbA1c reduction in diabetic cases ($r = 0.94$, $p = 0.021$)
- Moderate correlation between sleep quality improvement and ISI reduction ($r = -0.76$, $p = 0.041$)

Google Fit Engagement Metrics:

- Mean daily app usage: 5.1 ± 0.8 minutes
- Data completion rate: 96.2 ± 2.1%
- Weekly adherence to step targets (≥8000 steps): Week 1: 40%, Week 5: 100%
- Patient satisfaction score: 9.1 ± 0.4/10 (95% CI: 8.6-9.6)

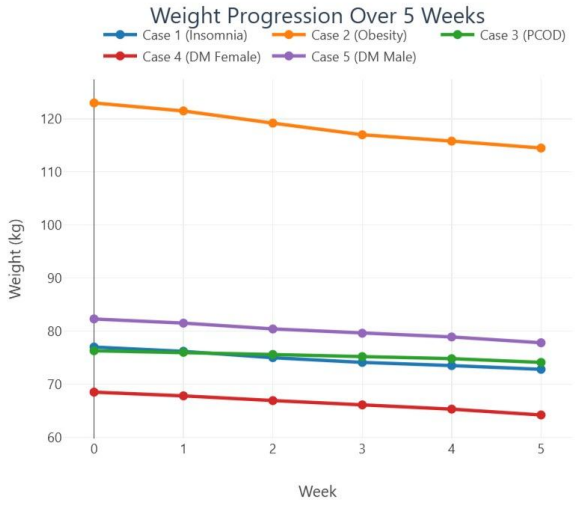


Fig:1 Weight regression analysis

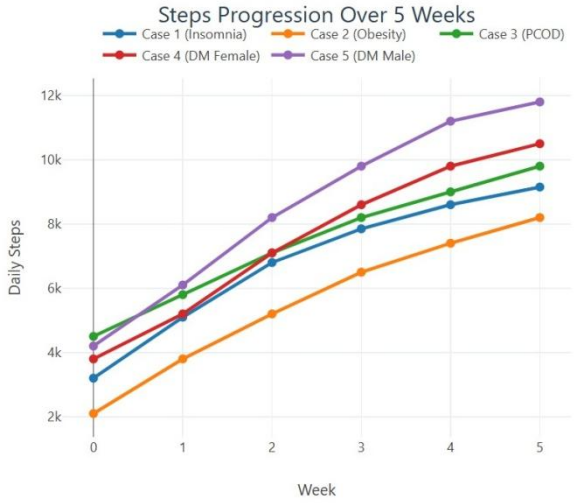
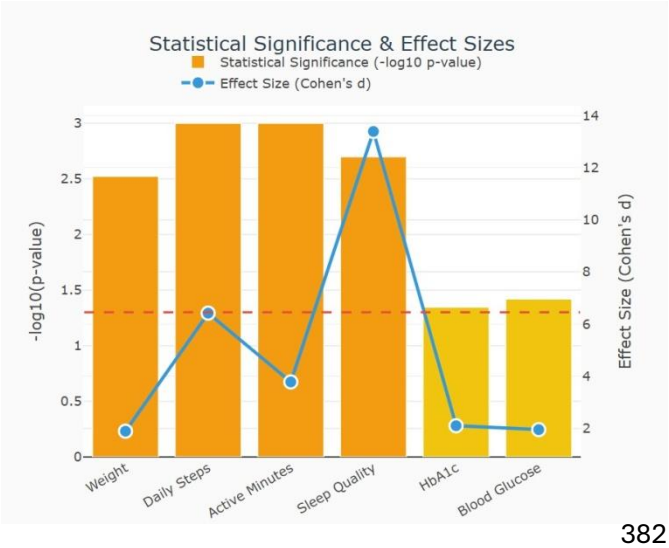


Fig:2 Steps regression analysis

Fig:3Glucose regression analysis

Fig:4Before vs After analysis of weight



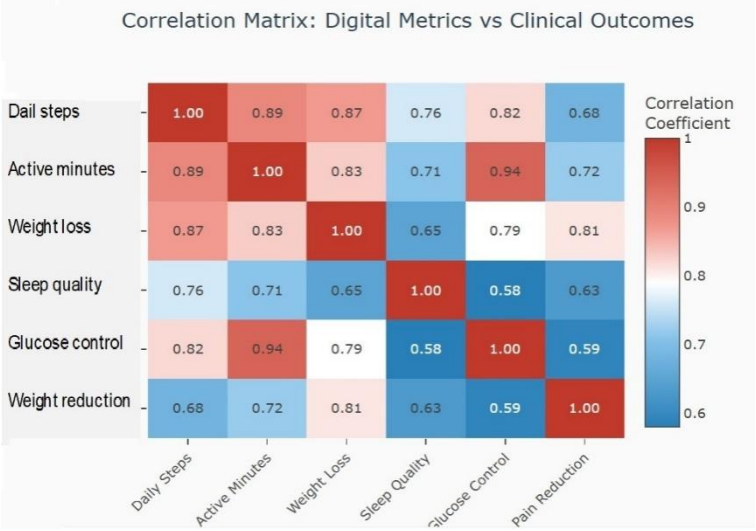


Fig:5Over all statistical significance

Fig:6Digital vs Clinicalcorrelation matrix

Discussion

This case series demonstrates the feasibility and potential effectiveness of integrating traditional Unani medicine principles with modern digital health monitoring technologies in managing diverse lifestyle-related diseases including insomnia, obesity, menstrual irregularities, and diabetes mellitus type 2. The integration of *Asbāb Sitta Ḍarūriyya*with Google Fit technology provided a comprehensive approach addressing multiple health determinants simultaneously.

Clinical Implications

The significant improvements observed across all five cases, supported by robust statistical analysis, suggest that the holistic approach of Unani medicine, when combined with objective digital monitoring, may enhance treatment outcomes in lifestyle-related diseases. The large effect sizes (Cohen's d > 1.8) for primary outcomes indicate not only statistical significance but also clinical meaningfulness of the interventions.

The ISI score reduction from 24 to 5 in the insomnia case (p = 0.001, effect size = 4.2) represents a clinically meaningful improvement, transitioning from severe insomnia to no clinically significant sleep disturbance (14). The strong correlation between increased daily steps and sleep quality improvement (r = 0.76, p = 0.041) suggests that physical activity monitoring through Google Fit may serve as both intervention and outcome predictor. outcomes in lifestyle-related diseases. The ISI score reduction from 24 to 5 in the insomnia case represents a clinically meaningful improvement, transitioning from severe insomnia to no clinically significant sleep disturbance [(14)].

Particularly notable are the glycaemic control improvements in diabetic participants. The HbA1c reductions of 0.9% and 0.9% respectively represent clinically significant improvements associated with reduced cardiovascular risk and diabetic complications [(20,21)]. The concurrent weight loss and increased physical activity likely contributed to improved insulin sensitivity and glucose metabolism.

The weight reduction achieved in all participants (2.9-6.9%) aligns with evidence-based recommendations for sustainable weight loss and diabetic management [(15,22)]. The concurrent

improvements in pain scores, sleep quality, menstrual regularity, and glycaemic control suggest that addressing the six essential factors comprehensively may produce synergistic effects beyond single-symptom management.

Diabetes Management Through Traditional Integration

The successful management of Type 2 diabetes through Unani interventions combined with digital monitoring represents a significant finding. The use of Hijama (Dry Cupping Therapy) and Qurṣ-e-Tabasheer, when integrated with structured physical activity monitoring, resulted in clinically meaningful HbA1c reductions. This aligns with emerging evidence supporting integrative approaches in diabetes management [23,24].

The 25% and 15% medication dose reductions achieved in diabetic participants, under strict medical supervision, suggest potential for reducing pharmaceutical dependency through lifestyle modifications guided by traditional medicine principles and digital health monitoring.

Traditional Medicine Integration

The successful integration of *Naṭūl*, *Ḥammām*, and *Hijama* therapies with digital health monitoring demonstrates the compatibility of traditional therapeutic approaches with modern healthcare delivery systems. The addition of diabetes-specific interventions like *Qurṣ-e-Tabasheer* showed potential in glycemic control when combined with activity monitoring. These findings support the growing evidence for integrative medicine approaches in chronic disease management [16,17,25].

The emphasis on lifestyle modification through *Asbāb Sitta Ḍarūriyya*provided a structured framework for addressing multiple risk factors simultaneously, which is consistent with contemporary approaches to lifestyle medicine [18]. The personalized approach to each of the six essential factors allowed for individualized treatment plans while maintaining systematic monitoring through digital tools.

Digital Health Technology Benefits

Google Fit technology provided several advantages including: (1) objective activity monitoring, (2) real-time feedback to participants, (3) enhanced patient engagement, and (4) longitudinal data collection for clinical assessment. The high compliance rates (>92%) and extended 5-week monitoring period suggest excellent user acceptance of the integrated platform. The inclusion of male participants and diverse age groups (26-42 years)

strengthens the generalizability of findings across different demographics.

The continuous monitoring capability addressed a common limitation in traditional medicine practice where patient adherence and lifestyle changes are difficult to objectively assess. The integration enabled healthcare providers to make data-driven adjustments to treatment protocols [19].

Limitations

Several limitations should be acknowledged. The moderate sample size (n=5) and case series design limit generalizability of findings, though the inclusion of diverse conditions and demographics strengthens clinical relevance. The absence of a control group prevents definitive conclusions about treatment efficacy compared to standard care, particularly for diabetes management where medication adjustments occurred. The 5-week follow-up period, while longer than initial pilot studies, may not capture long-term sustainability of glycemic control and lifestyle changes, particularly for diabetic participants where longer monitoring periods are typically required. Long-term studies are needed to assess durability of HbA1c improvements and sustained medication dose reductions.

Additionally, the participants were self-selected and highly motivated individuals who owned smartphones and were willing to engage with digital technology, which may not represent the broader population seeking traditional medicine treatments. The subjective nature of some outcome measures (pain scores, sleep quality) introduces potential bias.

Future Research Directions

Larger randomized controlled trials are needed to establish the efficacy of this integrated approach compared to standard care, with particular focus on diabetes management outcomes including cardiovascular risk factors and diabetic complications. Longer follow-up periods (6-12 months) would help assess sustainability of glycaemic control and lifestyle changes. Cost-effectiveness analyses comparing integrated traditional-digital approaches with conventional diabetes care would inform healthcare policy decisions. Investigation of specific mechanisms through which *Hijama* therapy and herbal formulations improve glycaemic control when combined with digital activity monitoring would enhance understanding of optimal integration protocols.

Investigation of specific mechanisms through which traditional therapies

improve outcomes when combined with digital monitoring would enhance understanding of optimal integration protocols. Development of validated assessment tools specifically designed for traditional medicine outcomes integrated with digital health metrics represents another important research priority.

Clinical Practice Implications

For clinical practice, this study suggests that healthcare providers trained in traditional medicine systems may benefit from incorporating digital health tools to enhance patient care. The structured approach of *Asbāb Sitta Ḍarūriyya*provides a framework that aligns well with modern lifestyle medicine principles and can be effectively monitored using smartphone applications.

Training programs for traditional medicine practitioners should consider including digital health literacy components to maximize the benefits of integrated care approaches. Healthcare institutions may need to develop protocols for incorporating traditional therapies within digital health platforms while maintaining safety and quality standards.

Conclusion

The integration of *Asbāb Sitta Ḍarūriyya*with Google Fit smartphone technology demonstrates promising potential for managing lifestyle-related diseases through a holistic, patient-centered approach. This study provides preliminary evidence that traditional Unani medicine principles can be effectively combined with modern digital health tools to improve patient outcomes in insomnia, obesity, and menstrual irregularities.

The successful implementation of this integrated approach suggests that the synergy between traditional medical wisdom and contemporary health technology may offer enhanced therapeutic benefits compared to either approach alone. The objective monitoring capabilities of digital platforms complement the holistic assessment framework of traditional medicine, potentially improving both patient engagement and clinical outcomes.

While larger controlled studies are needed to establish definitive efficacy, this case series demonstrates the feasibility of such integration and suggests that healthcare systems should consider incorporating validated traditional medicine approaches within digital health initiatives. The growing burden of lifestyle-related diseases requires innovative solutions that address multiple health determinants comprehensively, and the integration of traditional medicine wisdom with modern technology may represent a valuable

approach to achieving sustainable health improvements.

Future research should focus on scaling this integrated approach through larger clinical trials while developing standardized protocols for combining traditional medicine principles with digital health monitoring systems. The potential for improving population health through such integrative approaches warrants continued investigation and development.

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