

Lifestyle Guidance in Orthopedic Consultations: A Corpus-Based Analysis of Doctor–Patient Communication

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Abstract

This study presents an exploratory corpus-based analysis of lifestyle guidance in seven naturally occurring consultations between an orthopedic physician and patients. The consultations were audio-recorded and transcribed as part of a broader research program on medical and clinical dialogue. The analysis focuses on how general medical advice is transformed into concrete behavior that patients can carry out in everyday life. The data include guidance concerning physical activity, avoidance of prolonged sitting, footwear and assistive devices, self-care, symptom monitoring, and related behaviors. The analysis shows that the physician frequently goes beyond general recommendations by specifying time, frequency, concrete actions, and familiar everyday situations. Explanations of why an action is necessary, repetition, reformulation, and positive reinforcement are also used to support patients' understanding and continued self-management. These findings suggest that lifestyle guidance can be viewed as a communicative process of transforming medical advice into actionable everyday behavior. Although the corpus is small, the analysis provides categories and perspectives for future development of larger medical dialogue corpora. It also has potential applications to the generation of patient- and family-oriented consultation summaries, including multilingual summaries for patients who are not native speakers of Japanese.

Keywords: medical dialogue corpus, doctor–patient communication, actionable advice

1. Introduction

We have been conducting corpus-based research on spoken interaction in medical and clinical settings using transcriptions of audio-recorded conversations. In a collaborative research project with a cardiovascular hospital, doctor–patient consultations have been collected and analyzed, including the orthopedic consultations examined in the present study. In addition, at the Research Center for Medical Health Sciences, where the first author serves as a research fellow, research is being conducted on therapy-session data involving interactions between therapists and clients. We have also collected and analyzed conversational data between care workers and residents in a residential care facility.

These projects aim to investigate how communication actually takes place in medical and therapeutic settings on the basis of naturally occurring recorded interactions. Building on these exploratory analyses, we plan to continue collecting interactional data involving physicians, therapists, and other healthcare professionals and to develop a larger corpus of medical and clinical communication.

The present study forms part of this broader research program and focuses specifically on currently available interactions between an orthopedic physician and patients. It examines in detail how lifestyle guidance is provided during clinical consultations.

Clinical consultations are not limited to identifying symptoms, establishing diagnoses, and determining treatment plans. They also provide opportunities to support patients in managing their health after leaving the consultation room. For patients with chronic conditions in particular, self-management in everyday life may involve physical activity, walking, the use of assistive devices, medication, symptom monitoring, and other continuing behaviors.

The consultations examined in this study contain various forms of lifestyle guidance, including recommendations concerning physical activity, avoidance of prolonged sitting, the use of shoes and compression supports, massage, and topical medication.

Importantly, physicians do not simply tell patients to “exercise” or “avoid sitting for too long.” In some cases, they specify how long a patient should remain seated before moving, how long the patient should walk, or how the recommended behavior can be incorporated into an ordinary daily routine. They may also explain why a particular behavior is necessary, repeat the same recommendation, or reformulate it in different ways.

Such utterances can be viewed as communication through which general medical advice is transformed into behavior that patients can actually perform in their everyday lives.

The present study therefore conducts an exploratory analysis of lifestyle guidance in a small corpus of naturally occurring clinical consultations. It addresses the following three research questions:

1. What kinds of lifestyle guidance are provided in the consultations?
2. How is medical advice formulated as concrete behavior that patients can carry out in everyday life?
3. What communicative strategies are used to support patients' understanding, implementation, and maintenance of recommended behavior?

By addressing these questions, the study treats clinical interaction not simply as the transmission of medical information, but as a communicative process through which physicians support patients' everyday self-management.

2. Related Work

2.1 Doctor–Patient Communication and Self-Management

In the management of chronic conditions, care provided within medical institutions is only one part of the treatment process. Patients themselves need to manage their health continuously in everyday life.

Lorig and Holman (2003) characterize chronic-disease self-management as involving medical management, role management, and emotional management, and identify skills such as problem solving, decision making, action planning, and self-tailoring as important components of effective self-management.

Communication between healthcare professionals and patients plays an important role in supporting such activities. Patient-centered approaches have emphasized not only the disease itself but also the patient’s individual circumstances and experiences (Mead & Bower, 2000).

Lifestyle guidance can be regarded as one component of this self-management support. However, simply presenting medically desirable behaviors, such as exercising, avoiding prolonged sitting, or using an assistive device, does not necessarily make it clear how a patient should implement them in daily life.

For medical advice to become actual patient behavior, it may therefore need to be adapted to the patient’s everyday circumstances and expressed in an actionable form.

2.2 Analysis of Naturally Occurring Clinical Interaction

Research on doctor–patient communication has frequently made use of recordings of actual clinical encounters. From the perspective of conversation analysis, Maynard and Heritage (2005) emphasize the importance of examining medical consultations as naturally occurring social interaction.

Analysis of recorded consultations makes it possible to investigate not only the medical information communicated but also how information is sequentially presented, repeated, reformulated, or modified in response to patients.

More recently, doctor–patient conversation data have also been used for automatic extraction of medically relevant information. For example, Khosla et al. (2020) investigated the extraction of task-relevant utterances from doctor–patient conversations. Such work illustrates the growing importance of medical dialogue corpora not only for communication research but also for applications involving clinical documentation and patient support.

2.3 Positioning of the Present Study

Within this broader field of medical communication research, the present study focuses specifically on lifestyle guidance.

Rather than examining only what information is given, we investigate how general medical advice is transformed into:

medical advice → actionable everyday behavior

The present study is exploratory and is based on a small number of naturally occurring consultations. It does not

aim to make statistical generalizations about orthopedic consultations as a whole.

Instead, by examining the interactions in detail, we aim to identify linguistic and communicative features that can later be investigated systematically in a larger corpus of medical and clinical interaction.

3. Data and Methods

3.1 Data

The data consist of transcriptions of seven consultations between an orthopedic physician and patients recorded at a cardiovascular medical institution.

These seven consultations constitute the complete corpus analyzed in the present study. The corpus is therefore small, and the study should be regarded as an exploratory, fine-grained analysis rather than a large-scale quantitative investigation.

The consultations include discussions of foot conditions, walking, physical activity, swelling, footwear and compression supports, topical medication, massage, blood pressure, symptom progression, and other aspects of everyday self-management.

For example, in discussing prolonged sitting, the physician advises the patient that if they have been sitting for 30 minutes to an hour, even moving for about a minute can make a difference.

In another consultation, the physician explains the relationship between loose footwear and impaired foot movement before recommending that the patient tighten their shoelaces.

The collection of these data was reviewed and approved through the ethical review procedures of the medical institution. Patients participated on an opt-in basis and provided consent for their consultation data to be used for research.

The recorded consultations were automatically transcribed using automatic speech recognition (ASR). The original ASR output was retained where recognition errors were relevant to the analysis. For readability, obvious recognition errors were minimally corrected in the English excerpt below based on the local conversational context.

Doctor: You see how the skin is dry around here? When it gets like this, it can rub, and bacteria can get in. So it would be better to keep it moisturized with something like Vaseline or an ointment.

Patient: Is an ointment okay?

Doctor: Yes, that’s fine.

Patient: I have something like body lotion.

Doctor: Lotion is fine too. The important thing is not to let the skin get too dry.

Patient: I put a patch on it. Something like a gel patch, similar to a cooling sheet.

Doctor: Actually, I’d rather you didn’t use that.

Patient: Really?

Doctor: Yes. When you put that kind of patch on, it stays tightly attached to the skin. That can trap moisture and bacteria underneath it, so it's better not to use one if possible.

Patient: I see.

Doctor: Vaseline would be fine, so I think it would be better to apply that. I can prescribe some for you if you'd like.

3.2 Analytical Procedure

For the purposes of this study, lifestyle guidance was defined as physician utterances that encourage patients to initiate, modify, avoid, or continue behaviors in their everyday lives, together with utterances explaining why or how those behaviors should be performed.

The content of the lifestyle guidance was first classified into the following categories:

1. physical activity and exercise;
2. avoidance of prolonged inactivity;
3. use of footwear, compression supports, and other assistive devices;
4. foot and skin self-care;
5. medication and self-monitoring; and
6. symptom monitoring and help-seeking behavior.

We then examined how the physician communicated this guidance to the patient. Particular attention was paid to the following communicative functions:

- Instruction / Recommendation: directing or recommending an action;
- Explanation: explaining why the action is necessary;
- Behavioral specification: specifying time, frequency, duration, or concrete actions;
- Everyday-life example: relating the advice to a familiar daily situation;
- Repetition / Reformulation: repeating or rephrasing important guidance;
- Positive reinforcement: positively evaluating the patient's behavior or improvement and encouraging continuation.

Because the corpus is small, the primary goal was not to generalize the frequency of these categories. Instead, the analysis focused on how multiple communicative functions are combined within individual episodes of lifestyle guidance.

4. Results

4.1 Types of Lifestyle Guidance

The seven consultations contained a variety of forms of lifestyle guidance, including recommendations concerning physical activity, avoidance of prolonged sitting, the use of shoes and compression supports, massage and topical medication, blood-pressure monitoring, and seeking medical attention if symptoms worsened.

A notable characteristic of these instructions is that many concern behaviors that patients themselves must continue after leaving the consultation room.

For example, one patient was advised to continue stretching and massage as part of their own daily self-care. In another

consultation, the physician encouraged the patient to remain physically active in order to prevent blood from accumulating in the lower extremities.

Lifestyle guidance in these consultations therefore extends beyond treatment performed by medical staff and includes actions that patients must incorporate into their own routines.

4.2 From Medical Advice to Concrete Action

One of the clearest patterns in the corpus was the transformation of general medical recommendations into concrete, actionable behavior.

For example, the general recommendation to avoid prolonged sitting was elaborated through expressions equivalent to:

“when you have been sitting watching television for 30 minutes or an hour,”
“walk to the toilet or walk around for about a minute,”
and
“when you go shopping at a shopping mall, try walking a little longer.”

This sequence can be represented as:

general advice
→ temporal specification
→ concrete action
→ everyday-life example

The general recommendation “do not remain seated for too long” is thus transformed into an instruction that patients can apply directly: after sitting for a certain period, stand up and walk briefly.

A similar pattern occurs in guidance concerning footwear. Rather than merely instructing the patient to tighten their shoelaces, the physician explains that loose footwear allows the foot to move inside the shoe, interferes with effective use of the toes, and makes the push-off phase of walking more difficult. The explanation is then connected to the concrete behavior of tightening the shoelaces.

This can be summarized as:

physical condition or problem
→ explanation of the reason
→ required action

Lifestyle guidance therefore includes not only recommendations about what to do, but also communication that makes the recommended action understandable and actionable.

4.3 Communicative Strategies Supporting Self-Management

Repetition and reformulation were also observed in the corpus.

For example, the general recommendation not to remain seated for long periods was reformulated as the more concrete instruction to walk for one or two minutes after sitting for approximately an hour.

Such reformulation does more than restate the same information. It reduces the level of abstraction and makes the recommendation easier to implement.

The physician also used positive reinforcement when patients were already engaging in appropriate self-management.

In one consultation, after observing that swelling had decreased and the affected area had become softer, the physician encouraged the patient to continue the self-management behavior discussed in the consultation.

The interaction can be represented as:

patient behavior
→ observed improvement
→ positive evaluation
→ recommendation to continue

Lifestyle guidance in the corpus therefore includes not only the initiation of new behaviors, but also support for maintaining behaviors that patients are already performing successfully.

5. Discussion

5.1 From Medical Advice to Everyday Action

The most important pattern observed in this study is that medical advice is frequently transformed into behavior that patients can implement in everyday life.

The physician does not merely state general recommendations such as “exercise” or “avoid prolonged sitting.” Instead, the advice is elaborated by specifying:

- when the action should be performed;
- how much or how long it should be performed; and
- what the patient should actually do.

The physician may then relate the recommendation to familiar situations in the patient’s everyday life.

From this perspective, lifestyle guidance is not simply a form of knowledge transfer. It is also a form of action-oriented communication through which patients are helped to understand what they should do after leaving the consultation room.

Expressions such as “after sitting for 30 minutes to an hour, walk for about a minute” can therefore be regarded as transformations of general medical recommendations into practical behavioral rules.

5.2 The Role of Repetition and Reformulation

Repetition and reformulation were also characteristic of lifestyle guidance in the present corpus.

In written communication, repetition may sometimes be considered redundant. In clinical interaction, however, repeating an important behavioral recommendation may serve to emphasize what the patient needs to remember after the consultation.

Reformulation also appears to play an important role. For example:

“Do not remain seated for too long”

→ “after 30 minutes to an hour”
→ “walk for about a minute”
→ “walk to the toilet”

In this sequence, the underlying recommendation remains the same, but each successive formulation becomes more concrete.

Reformulation can therefore be interpreted as a movement from:

abstract advice → concrete action

and may constitute an important communicative strategy for bridging the gap between medical recommendations and everyday behavior.

5.3 Implications for Medical Dialogue Corpus Development

The corpus analyzed in this study contains only seven consultations, and the observed patterns cannot be generalized to orthopedic consultations as a whole.

Nevertheless, close analysis of a small number of naturally occurring consultations provides useful indications of what should be annotated in future medical dialogue corpora.

Possible annotation categories include:

- the behavior targeted by the guidance;
- instruction and recommendation;
- rationale for the recommended behavior;
- time, frequency, and conditions;
- everyday-life contexts;
- repetition and reformulation; and
- positive reinforcement.

Systematically annotating such features in a larger corpus would make it possible to compare lifestyle guidance across physicians, medical specialties, patient groups, and different types of clinical interaction.

Future work will therefore extend beyond the orthopedic consultations examined here to include other doctor–patient interactions as well as therapy sessions involving therapists and clients.

A larger corpus could support comparative analyses of communication functions such as explanation, advice, empathy, motivation, and self-management support across different medical and clinical settings.

5.4 Application to Patient- and Family-Oriented Consultation Summaries

The analysis of lifestyle guidance presented in this study also has potential applications to the automatic generation of consultation summaries for patients and their families.

The same clinical dialogue may need to be summarized differently depending on the intended user. A SOAP-style summary is designed primarily for healthcare professionals, whereas patients and their families may need a more action-oriented summary focusing on what to do, what to continue, what to avoid, and when to seek further medical attention. These two forms of summarization should therefore not be treated as interchangeable. In future work, we plan to investigate how automatically transcribed clinical dialogue

can be transformed into both clinician-oriented structured records and patient-oriented actionable summaries.

During a medical consultation, patients must listen to the physician, describe their symptoms, respond to questions, and sometimes make decisions about treatment. Under such circumstances, it may be difficult to take detailed notes at the same time. Even when patients understand the physician's explanation during the consultation, they may later forget some of the recommendations or precautions they were given, particularly when several instructions are presented within a short period of time.

The consultations examined in this study contain many concrete instructions concerning what patients should do after leaving the medical institution, such as taking short walks after prolonged sitting, tightening shoelaces appropriately, continuing massage or topical medication, and contacting the medical institution if symptoms worsen.

If such information could be automatically extracted from doctor-patient dialogue and organized into a concise patient-oriented summary, it could provide practical support for self-management after the consultation.

For example, a summary might be structured as follows:

What to continue doing

- Avoid remaining seated for long periods and walk briefly at regular intervals.
- Tighten your shoelaces properly when walking.
- Continue the recommended massage and topical medication.

When to seek medical attention

- Contact the medical institution if your symptoms suddenly worsen.

Such summaries may also be useful for patients' families. This may be particularly important for older patients whose family members are unable to attend the consultation. When information is conveyed only indirectly through the patient afterward, family members may find it difficult to understand precisely what the physician recommended.

With the patient's consent and appropriate attention to privacy, a clearly structured consultation summary could help family members understand the patient's daily precautions and recommended self-management activities. This could facilitate family support and may also provide reassurance to family members caring for older patients.

Multilingual generation represents another potentially important application. If a consultation conducted in Japanese could be summarized in a language that the patient or family understands more fully, the same approach could support non-Japanese-speaking patients and their families.

Importantly, generating such summaries should not simply involve shortening the entire consultation transcript. A useful patient-oriented summary would need to identify information such as:

- what the patient should do;
- when and how often it should be done;

- why the action is necessary;
- what should be continued; and
- under what circumstances the patient should contact the medical institution.

The analytical perspective proposed in this study, i.e. from medical advice to actionable everyday behavior, may therefore provide not only a framework for describing medical communication but also a basis for identifying the types of information that should be prioritized in patient- and family-oriented consultation summaries.

A further challenge, however, is that such summaries may be generated from imperfect ASR transcripts. Misrecognition of medication names, symptoms, or behavioral instructions could directly affect the reliability of generated summaries.

5.5 Contextual Interpretation and Correction of ASR Errors

Another issue relevant to the generation of consultation summaries is the presence of errors in automatic speech recognition (ASR) output. Clinical speech includes specialized terminology, spontaneous speech, disfluencies, and other characteristics that may cause recognition errors. If such errors are passed directly to subsequent summarization or translation processes, they may affect the reliability of the generated output.

An interesting observation in our preliminary analysis was that generative AI sometimes produced a medically plausible term even when the corresponding term had been incorrectly recognized by ASR. For example, one ASR transcript contained the erroneous string “代替齒頭筋.” However, a summary generated from the transcript contained “四頭筋” (quadriceps), a medically plausible term that did not appear in the ASR output in that form. From the surrounding context, a knowledgeable human reader might infer that the intended term was “大腿四頭筋” (quadriceps femoris).

A knowledgeable human reader may infer from the surrounding context that the recognized expression is incorrect and that the intended reference concerns the quadriceps, more specifically the daitai-shitokin (“大腿四頭筋,” quadriceps femoris). The generative AI output is consistent with a form of contextual reconstruction based on information beyond the surface form of the ASR transcript.

This observation suggests that generative AI may contribute not only to summarization but also to the contextual interpretation of noisy clinical ASR output. However, such reconstruction should not automatically be regarded as correct. A language model may also replace an unfamiliar or ambiguous expression with a plausible but incorrect term. Future work should therefore evaluate such corrections against the original audio and expert judgment, and distinguish successful contextual reconstruction from unsupported modification.

6. Conclusion

This study conducted an exploratory analysis of lifestyle guidance in a small corpus consisting of seven naturally occurring consultations between an orthopedic physician and patients.

The consultations included various forms of lifestyle guidance concerning physical activity, avoidance of prolonged sitting, footwear and assistive devices, self-care, and other behaviors relevant to everyday disease management.

The analysis showed that medical advice was often not presented merely as a general recommendation. Instead, the physician specified time, frequency, concrete actions, and familiar everyday situations in order to transform general advice into behavior that patients could actually perform.

Explanations of why an action was necessary, repetition, reformulation, and positive reinforcement were also observed as communicative strategies supporting patients' understanding and continued self-management.

The present study therefore proposes that lifestyle guidance in clinical consultations can be viewed as a communicative process of transforming:

medical advice → actionable everyday behavior

The corpus is small, and the findings cannot be generalized to orthopedic practice as a whole. Nevertheless, detailed analysis of naturally occurring clinical interaction makes it possible to identify categories and analytical perspectives that can be tested in a larger medical dialogue corpus.

Future work will involve continued collection of doctor–patient interactions and therapy-session data in order to compare communicative practices across different medical and clinical settings.

The findings also suggest practical applications. In particular, extracting actionable information from clinical dialogue could support the generation of patient- and family-oriented consultation summaries. Such summaries may help patients remember what they were advised to do after the consultation, support family members caring for older patients, and, when provided in multiple languages, contribute to communication support for patients who are not native speakers of Japanese. Future work should also examine how errors in clinical ASR can be identified or contextually reconstructed before such summaries are generated.

In this way, the detailed analysis of naturally occurring medical dialogue may contribute not only to the study of clinical communication but also to the development of practical tools that connect communication in the consultation room with patients' everyday self-management.

7. Bibliographical References

- Khosla, S., Vashishth, S., Lehman, J. F., & Rosé, C. P. (2020). MedFilter: Improving extraction of task-relevant utterances from doctor–patient conversations through integration of discourse structure and ontological knowledge., *Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing (EMNLP)*, pages 7781–7797.
- Lorig, K. R., & Holman, H. (2003). Self-management education: history, definition, outcomes, and mechanisms. *Annals of Behavioral Medicine*, 26(1), 1–7.
- Maynard, D. W., & Heritage, J. (2005). Conversation analysis, doctor–patient interaction and medical communication. *Medical Education*, 39(4), 428–435.
- Mead, N., & Bower, P. (2000). Patient-centredness: A conceptual framework and review of the empirical literature. *Social Science & Medicine*, 51(7), 1087–1110.