

BUKTI *CORRESPONDING AUTHOR* PUBLIKASI PENELITIAN

Judul artikel Modified brief counseling-5A, motivational SMS on medication-taking behavior and compliance among dia
Penulis Ginanjar Zukhruf Saputri¹ , Okta Muthia Sari² , Akrom Akrom¹
Jurnal IJPHS
International Journal of Public Health Science (IJPHS) Vol. 11, No. 3, September 2022, pp. 852~860 ISSN: 2252-8806, DOI: 10.11591/ijphs.v11i3.21348
Keterangan Syarat Khusus

Lampiran:

Tanggal	Aktivitas	Keterangan
Tue, Sep 21, 2021 at 11:25 AM	Submit Artikel melalui OJS IJPHS	Terlampir
Thu, Oct 14, 2021 at 3:25 PM	Revisi naskah	Terlampir
Tue, Dec 14, 2021 at 2:10 PM	Revisi naskah (template)	Terlampir
Tue, Feb 15, 2022 at 8:49 AM	Revisi naskah	Terlampir
Sun, Feb 20, 2022 at 2:08 PM	Revisi naskah	Terlampir
Sun, Feb 20, 2022 at 2:08 PM	Revisi naskah dan daftar pustaka	Terlampir
Tue, Mar 29, 2022 at 2:37 PM	Revisi layout naskah	Terlampir
Wed, Jun 8, 2022 at 3:15 PM	Revisi galley proof	Terlampir
Fri, Jun 24, 2022 at 9:11 AM	Publikasi artikel di IJPHS	Terlampir



Ginanjari Zukhruf Saputri <zukhruf.alparslan@gmail.com>

[IJPHS] Submission Acknowledgement

1 message

Lina Handayani <ijphs@iaescore.com>

Tue, Sep 21, 2021 at 11:25 AM

To: "M.Sc.,Apt Ginanjari Zukhruf Saputri" <zukhruf.alparslan@gmail.com>

The following message is being delivered on behalf of International Journal of Public Health Science (IJPHS).

M.Sc.,Apt Ginanjari Zukhruf Saputri:

Thank you for submitting the manuscript, "EFFECTS OF MODIFIED BRIEF COUNSELING-5A AND RELIGIOUS MOTIVATIONAL SMS ON MEDICATION-TAKING BEHAVIOR AND COMPLIANCE OF DIABETES MELLITUS PATIENTS" to International Journal of Public Health Science (IJPHS). With the online journal management system that we are using, you will be able to track its progress through the editorial process by logging in to the journal web site:

Manuscript URL:

<https://ijphs.iaescore.com/index.php/IJPHS/author/submission/21348>

Username: ginanjari zukhruf

If you have any questions, please contact me. Thank you for considering this journal as a venue for your work.

Lina Handayani

International Journal of Public Health Science (IJPHS)

International Journal of Public Health Science (IJPHS)

<http://ijphs.iaescore.com>



Ginanjar Zukhruf Saputri <zukhruf.alparslan@gmail.com>

[IJPHS] Editor Decision

3 messages

Lina Handayani <ijphs@iaescore.com>

Thu, Oct 14, 2021 at 3:25 PM

Reply-To: "Dr. Lina Handayani" <ijphs@iaescore.com>

To: "M.Sc.,Apt Ginanjar Zukhruf Saputri" <zukhruf.alparslan@gmail.com>

Cc: Akrom Akrom <akrom@pharm.uad.ac.id>, Okta Mutia Sari <muthiaoktasari@gmail.com>

The following message is being delivered on behalf of International Journal of Public Health Science (IJPHS).

Dear Prof/Dr/Mr/Mrs: M.Sc.,Apt Ginanjar Zukhruf Saputri,

We have reached a decision regarding your submission entitled "EFFECTS OF MODIFIED BRIEF COUNSELING-5A AND RELIGIOUS MOTIVATIONAL SMS ON MEDICATION-TAKING BEHAVIOR AND COMPLIANCE OF DIABETES MELLITUS PATIENTS" to International Journal of Public Health Science (IJPHS), a peer-reviewed and an OPEN ACCESS journal that makes significant contributions to major areas of public health science.

Our decision is revisions required.

The goal of your revised paper is to describe novel technical results.

A high quality paper MUST has:

- (1) a clear statement of the problem the paper is addressing --> explain in "Introduction" section
- (2) the proposed solution(s)/method(s)/approach(es)/framework(s)/
- (3) results achieved. It describes clearly what has been done before on the problem, and what is new.

In preparing your revised paper, you should pay attention to:

1. Please ensure that: all references have been cited in your text; Each citation should be written in the order of appearance in the text; The references must be presented in numbering and CITATION ORDER is SEQUENTIAL [1], [2], [3], [4],

Please download & study our published papers for your references:

- <http://ijphs.iaescore.com>

- <http://ijere.iaescore.com>

- <http://journal.uad.ac.id/index.php/edulearn>

- <http://iaescore.com/journals> (other journals)

(Please use "Search" menu under "JOURNAL CONTENT" menu in right side of the site)

2 An Introduction should contain the following three (3) parts:

- Background: Authors have to make clear what the context is. Ideally, authors should give an idea of the state-of-the art of the field the report is about.
- The Problem: If there was no problem, there would be no reason for writing a manuscript, and definitely no reason for reading it. So, please tell readers why they should proceed reading. Experience shows that for this part a few lines are often sufficient.
- The Proposed Solution: Now and only now! - authors may outline the contribution of the manuscript. Here authors have to make sure readers point out what are the novel aspects of authors work. Authors should place the paper in proper context by citing relevant papers. At least, 5 references (recently journal articles) are used in this section.

3. Results and discussion section: The presentation of results should be simple and straightforward in style. This section report the most important findings, including results of statistical analyses as appropriate. You should present the comparison between performance of your approach and other researches. Results given in figures should not be repeated in tables. It is very important to prove that your manuscript has a significant value and not trivial.

Please submit your revised paper within 6 weeks.

I look forward for hearing from you

Thank you

Best Regards,
Dr. Lina Handayani
Universitas Ahmad Dahlan
ijphs@iaescore.com

Update your metadata in our online system when you submit your revised paper through our online system, included:

- Authors name are presented without salutation
- Authors Name are presented Title Case (ex: Michael Lankan, and NOT written--> michael lankan or MICHAEL LANKAN). Add all authors of your paper as per your revised paper
- Title of revised paper (ex: Application of space vector , NOT --> APPLICATION OF SPACE VECTOR)
- Your abstract

Reviewer A:

Does the paper contain an original contribution to the field?:

Yes

Is the paper technically sound?:

Yes

Does the title of the paper accurately reflect the major focus contribution of this paper?:

Yes

Please suggest change of the title as appropriate within 10 words:
the title as appropriate within 10 words

Is the abstract a clear description of the paper?

:

Yes

Please suggest change of the abstract

:

The Abstract (MAX 200 WORDS)

Is the paper well written (clear, concise, and well organized)?:

Yes

Are the equations, figures and tables in this journal style, clear, relevant, and are the captions adequate?:

Yes

Please score the paper on a scale of 0 - 10 as per the directions below:

9-10 Excellent - Outstanding

7-8 Good

5-6 Average

3-4 Poor

0-2 Very Poor

:

8

Comments to the Authors (how to improve this paper)::

1. discussion: what about respondents who did not provide confirmation?

- what will the next researcher do?
2. why is this the result of this research? what factors cause it?
 3. does it mean that the intervention provided is not in accordance with the respondent's needs?
 4. what are the implications of the results of this study in future research?

International Journal of Public Health Science (IJPHS)
<http://ijphs.iaescore.com>

Ginanjar Zukhruf Saputri <zukhruf.alparslan@gmail.com>
To: "Dr. Lina Handayani" <ijphs@iaescore.com>
Cc: Mr Akrom yk <akrom@pharm.uad.ac.id>, Sari Muthiaokta <muthiaoktasari@gmail.com>

Fri, Dec 10, 2021 at 5:33 AM

Dear The Editorial team of IJPHS

Here is our revision of our manuscript
I already uploaded in the system

We really appreciate for the reviewers' suggestions
and all of suggestions already revised in this manuscript

(1) a clear statement of the problem the paper is addressing --- already revised in background section
in paragraph 5, line 6-13

and other suggestions about:

1. discussion: what about respondents who did not provide confirmation?
what will the next researcher do?
2. why is this the result of this research? what factors cause it?
3. does it mean that the intervention provided is not in accordance with the respondent's needs?
4. what are the implications of the results of this study in future research?

are revised in in results and discussion sesction
In the last paragraph (17-18)

thank you for your kindness

Best Regards,

Ginanjar Zukhruf Saputri.,M.Sc.,Apt
zukhruf.alparslan@gmail.com
Pharmacy Faculty of Ahmad Dahlan University
Yogyakarta, Indonesia

[Quoted text hidden]

 **Full text- brief counseling 5a rev 1.docx**
67K

IJPHS Editor <ijphs@iaescore.com>
To: Ginanjar Zukhruf Saputri <zukhruf.alparslan@gmail.com>
Cc: Mr Akrom yk <akrom@pharm.uad.ac.id>, Sari Muthiaokta <muthiaoktasari@gmail.com>

Fri, Dec 10, 2021 at 2:06 PM

Noted with thanks.

[Quoted text hidden]



Ginanjar Zukhruf Saputri <zukhruf.alparslan@gmail.com>

[IJPHS] Editor Decision

4 messages

Lina Handayani <ijphs@iaescore.com>

Tue, Dec 14, 2021 at 2:10 PM

Reply-To: "Dr. Lina Handayani" <ijphs@iaescore.com>

To: "M.Sc.,Apt Ginanjar Zukhruf Saputri" <zukhruf.alparslan@gmail.com>

Cc: Akrom Akrom <akrom@pharm.uad.ac.id>, Okta Mutia Sari <muthiaoktasari@gmail.com>

The following message is being delivered on behalf of International Journal of Public Health Science (IJPHS).

Dear Prof/Dr/Mr/Mrs: M.Sc.,Apt Ginanjar Zukhruf Saputri,

write adhere our template carefully

International Journal of Public Health Science (IJPHS)

<http://ijphs.iaescore.com>

Ginanjar Zukhruf Saputri <zukhruf.alparslan@gmail.com>

Fri, Jan 21, 2022 at 4:46 AM

To: "Dr. Lina Handayani" <ijphs@iaescore.com>

Dear Editorial IJPHS

with this email, we already sent the revision of our paper
thank you for your kindness


Best Regards,

Ginanjar Zukhruf Saputri.,M.Sc.,Apt

zukhruf.alparslan@gmail.com

Pharmacy Faculty of Ahmad Dahlan University
Yogyakarta, Indonesia

[Quoted text hidden]

 **Full text- brief counseling 5a rev 2.docx**
68K

IJPHS Editor <ijphs@iaescore.com>

Wed, Feb 2, 2022 at 9:14 AM

To: Ginanjar Zukhruf Saputri <zukhruf.alparslan@gmail.com>

please for the revision results you can upload them via our journal system

[Quoted text hidden]

Ginanjar Zukhruf Saputri <zukhruf.alparslan@gmail.com>

Wed, Feb 2, 2022 at 12:25 PM

To: IJPHS Editor <ijphs@iaescore.com>

ok I will do that

thank you

Best Regards,

Ginanjar Zukhruf Saputri.,M.Sc.,Apt

zukhruf.alparslan@gmail.com

Pharmacy Faculty of Ahmad Dahlan University
Yogyakarta, Indonesia

[Quoted text hidden]



Ginanjar Zukhruf Saputri <zukhruf.alparslan@gmail.com>

[IJPHS] Editor Decision

3 messages

Lina Handayani <ijphs@iaescore.com>

Tue, Feb 15, 2022 at 8:49 AM

Reply-To: "Dr. Lina Handayani" <ijphs@iaescore.com>

To: "M.Sc.,Apt Ginanjar Zukhruf Saputri" <zukhruf.alparslan@gmail.com>

Cc: Akrom Akrom <akrom@pharm.uad.ac.id>, Okta Mutia Sari <muthiaoktasari@gmail.com>

The following message is being delivered on behalf of International Journal of Public Health Science (IJPHS).

Dear Prof/Dr/Mr/Mrs: M.Sc.,Apt Ginanjar Zukhruf Saputri,

- write adhere our template
- IJPHS requires at least 30 references in recent 10 years
- write biographies of authors after references section

International Journal of Public Health Science (IJPHS)

<http://ijphs.iaescore.com>

Ginanjar Zukhruf Saputri <zukhruf.alparslan@gmail.com>

Fri, Feb 18, 2022 at 4:38 PM

To: "Dr. Lina Handayani" <ijphs@iaescore.com>

Dear Editorial IJPHS

Thank you for the correction.

With this email I send the revision of our manuscript.

thank you

Best Regards,

Ginanjar Zukhruf Saputri.,M.Sc.,Apt

zukhruf.alparslan@gmail.com

Pharmacy Faculty of Ahmad Dahlan University

Yogyakarta, Indonesia

[Quoted text hidden]



ijphs. template. Artikel Ginanjar Zukhruf Saputri 2022.docx

535K

IJPHS Editor <ijphs@iaescore.com>

Fri, Feb 25, 2022 at 2:50 PM

To: Ginanjar Zukhruf Saputri <zukhruf.alparslan@gmail.com>

thank you

[Quoted text hidden]



Ginanjar Zukhruf Saputri <zukhruf.alparslan@gmail.com>

[IJPHS] Editor Decision

3 messages

Lina Handayani <ijphs@iaescore.com>

Sun, Feb 20, 2022 at 2:08 PM

Reply-To: "Dr. Lina Handayani" <ijphs@iaescore.com>

To: "M.Sc.,Apt Ginanjar Zukhruf Saputri" <zukhruf.alparslan@gmail.com>

Cc: Akrom Akrom <akrom@pharm.uad.ac.id>, Okta Mutia Sari <muthiaoktasari@gmail.com>

The following message is being delivered on behalf of International Journal of Public Health Science (IJPHS).

-- Authors must strictly follow the guidelines for authors at <http://iaescore.com/gfa/ijphs.docx>
-- Number of minimum references is 30 sources (mainly journal articles) for research paper
-- and minimum 50 sources (mainly journal articles) for review paper

Dear Prof/Dr/Mr/Mrs: M.Sc.,Apt Ginanjar Zukhruf Saputri,

It is my great pleasure to inform you that your paper entitled "EFFECTS OF MODIFIED BRIEF COUNSELING-5A AND RELIGIOUS MOTIVATIONAL SMS ON MEDICATION-TAKING BEHAVIOR AND COMPLIANCE OF DIABETES MELLITUS PATIENTS" is ACCEPTED and will be published on the International Journal of Public Health Science (IJPHS). This journal is accredited SINTA 1 by Ministry of Research and Technology/National Research and Innovation Agency, Republic of Indonesia (RISTEK-BRIN) and has ACCEPTED for inclusion (indexing) in Scopus (<https://suggestor.step.scopus.com/progressTracker/?trackingID=D331D503BA1584BF>) since 2020 issues ([https://www.scopus.com/results/results.uri?src=s&st1=&st2=&sot=b&sdt=b&origin=searchbasic&rr=&sl=57&s=SRCTITLE%20\(International%20Journal%20of%20Public%20Health%20Science\)](https://www.scopus.com/results/results.uri?src=s&st1=&st2=&sot=b&sdt=b&origin=searchbasic&rr=&sl=57&s=SRCTITLE%20(International%20Journal%20of%20Public%20Health%20Science))). Congratulations!

Please prepare your final camera-ready paper (in MS Word or LATEX file format) adheres to every detail of the guide of authors (MS Word: <http://iaescore.com/gfa/ijphs.docx>, or <http://iaescore.com/gfa/ijphs.rar> for LATEX file format), and check it for spelling/grammatical mistakes. Then you should upload your final paper through our online system (as "author version" under our decision, NOT as new submission).

You should submit your camera-ready paper along with your payment receipt and similarity report (that less than 25%) within 6 weeks.

I look forward to hearing from you.

Thank you

Best Regards,
Dr. Lina Handayani

Please ensure that all references have been cited in your text. Each citation should be written in the order of appearance in the text in square brackets. For example, the first citation [1], the second citation [2], and the third and fourth citations [3,4]. When citing multiple sources at once, the preferred method is to list each number separately, in its own brackets, using a comma or dash between numbers, as such: [1], [3], [5] or [4-8]. It is not necessary to mention an author's name, pages used, or date of publication in the in-text citation. Instead, refer to the source with a number in a square bracket, e.g. [9], that will then correspond to the full citation in your reference list. Examples of in-text citations:

This theory was first put forward in 1970 [9]."
Bloom [10] has argued that...
Several recent studies [7], [9], [11-15] have suggested that....
...end of the line for my research [16].....

In order to cover part of the publication cost, each accepted paper is charged: USD 215 (~IDR 3000K). This charge is for the first 8 pages, and if any published manuscript over 8 pages will incur extra charges USD 50 (~IDR 700K) per page

The payment should be made by bank transfer (T/T):

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Branch Office: Kusumanegara Yogyakarta
City: Yogyakarta
Country : Indonesia
Bank Account #: 760164155700 (formerly: 5080104447117)
SWIFT Code: BNI AIDJAXXX (PT. BANK CIMB NIAGA, TBK. in JAKARTA)

IMPORTANT!!!

- You should submit your payment receipt (along with your camera-ready paper along with your similarity report) within 6 weeks to email:

ijphs@iaescore.com

- All correspondence should be addressed to the emails (support by phone is not provided).

International Journal of Public Health Science (IJPHS)

<http://ijphs.iaescore.com>

Ginanjar Zukhruf Saputri <zukhruf.alparслан@gmail.com>

Fri, Feb 25, 2022 at 11:56 PM

To: "Dr. Lina Handayani" <ijphs@iaescore.com>

Cc: Akrom Akrom <akrom@pharm.uad.ac.id>, Okta Mutia Sari <muthiaoktasari@gmail.com>

Dear Editorial IJPHS

Thank you for the information.

Here we attached for the similarity of the manuscript

Best Regards,

Ginanjar Zukhruf Saputri, M.Sc., Apt

zukhruf.alparслан@gmail.com

Pharmacy Faculty of Ahmad Dahlan University

Yogyakarta, Indonesia

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2 attachments



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IJPHS Editor <ijphs@iaescore.com>

Tue, Mar 8, 2022 at 1:46 PM

To: Ginanjar Zukhruf Saputri <zukhruf.alparслан@gmail.com>

Cc: Akrom Akrom <akrom@pharm.uad.ac.id>, Okta Mutia Sari <muthiaoktasari@gmail.com>

Received, thank you.

[Quoted text hidden]



Ginanjar Zukhruf Saputri <zukhruf.alparslan@gmail.com>

Fwd: [IJPHS] Revision ID 21348

10 messages

Maria ulfah <ulfah057@gmail.com>

Tue, Mar 29, 2022 at 2:37 PM

To: Ginanjar Zukhruf Saputri <zukhruf.alparslan@gmail.com>

Dear Author,

Salam,

Kami informasikan bahwa artikel Anda perlu perbaikan, dengan email ini kami lampirkan file yang perlu direvisi dan kami telah memberikan komentar pada file tersebut. Mohon untuk revisi pada file yang telah kami lampirkan dan beri tanda kuning pada bagian yang anda revisi dan mohon kirimkan file Bibtex kepada kami untuk diedit. Kami beri waktu hingga 31 Maret 2022. Terima kasih banyak atas perhatiannya.

--

Best Regards,

Maria Ulfah

Editorial Staff on behalf of Editor-in-Chief

Staff International Journal of Public Health Science (IJPHS)

<http://ijphs.iaescore.com/index.php/IJPHS/index>

--

Best Regards,

Maria Ulfah

Editorial Staff on behalf of Editor-in-Chief

Staff International Journal of Public Health Science (IJPHS)

<http://ijphs.iaescore.com/index.php/IJPHS/index>**21348.docx**

492K

Ginanjar Zukhruf Saputri <zukhruf.alparslan@gmail.com>

Thu, Mar 31, 2022 at 9:08 AM

To: Maria ulfah <ulfah057@gmail.com>, Mr Akrom yk <akrom@pharm.uad.ac.id>, Sari Muthiaokta <muthiaoktasari@gmail.com>

Kepada Yth Editorial IJPHS

sebelumnya mohon maaf atas keterlambatannya

berikut kami kirimkan revisi terakhir naskah kami termasuk perbaikan pada daftar pustaka mendeley template terimakasih

*Best Regards,***Ginanjar Zukhruf Saputri.,M.Sc.,Apt**zukhruf.alparslan@gmail.com

Pharmacy Faculty of Ahmad Dahlan University

Yogyakarta, Indonesia

[Quoted text hidden]

**21348 REVISI MANDELEY 31maret 2022.docx**

460K

Maria ulfah <ulfah057@gmail.com>

Fri, Apr 1, 2022 at 10:45 AM

To: Ginanjar Zukhruf Saputri <zukhruf.alparslan@gmail.com>

terima kasih banyak atas revisinya. akan kami informasikan kembali jika ada perbaikan.

[Quoted text hidden]

Ginanjar Zukhruf Saputri <zukhruf.alparслан@gmail.com>

Tue, Apr 12, 2022 at 8:31 AM

To: Maria ulfah <ulfah057@gmail.com>

kepada Yth Tim Editorial IJPHS,

salam, Ibu Maria Ulfa, mohon ijin untuk menanyakan terkait administrasi biaya publikasi untuk artikel yang sudah accepted apakah kami akan dikirim invoice nya?
mengingat sebelumnya sy pernah mendapat balasan email untuk biaya publikasi, namun demikian belum tertuliskan secara rinci nominal yang harus kami sampaikan.
terimakasih

salam

Best Regards,

Ginanjar Zukhruf Saputri.,M.Sc.,Apt

zukhruf.alparслан@gmail.com

Pharmacy Faculty of Ahmad Dahlan University

Yogyakarta, Indonesia

[Quoted text hidden]

Maria ulfah <ulfah057@gmail.com>

Tue, Apr 12, 2022 at 11:14 AM

To: Ginanjar Zukhruf Saputri <zukhruf.alparслан@gmail.com>

Dear Dr. Ginanjar,

Berikut kami lampirkan Invoice untuk artikel anda

[Quoted text hidden]

 **Invoice ID 21348.pdf**
19K

Ginanjar Zukhruf Saputri <zukhruf.alparслан@gmail.com>

Sun, May 15, 2022 at 1:34 PM

To: Maria ulfah <ulfah057@gmail.com>

Yth Editorial IJPHS

assalamualaikum wr wb,
berikut kami kirimkan bukti transfer publikasi atas nama Ginanjar Zukhruf Saputri
terimakasih

TRANSFER

RESI : 011919
WAKTU : 15 Mei 2022 13:31
DARI : 801211013525
PENGIRIM : GINANJAR ZUKHRUF
SAPUTRI
KE : 760164155700
PENERIMA : LINA HANDAYANI
BANK TUJUAN : BANK CIMB NIAGA
KETERANGAN : biaya publikasi an Ginanjar
Zukhruf Saputri
JUMLAH : Rp. 3.850.000,00
ADMIN : Rp. 6.500,00
STATUS : SUKSES

Best Regards,

Ginanjar Zukhruf Saputri.,M.Sc.,Apt

zukhruf.alparslan@gmail.com

Pharmacy Faculty of Ahmad Dahlan University

Yogyakarta, Indonesia

[Quoted text hidden]



biaya publikasi an Ginanjar Zukhruf Saputri.jpeg
76K

Maria ulfah <ulfah057@gmail.com>

Tue, May 17, 2022 at 8:51 AM

To: Ginanjar Zukhruf Saputri <zukhruf.alparslan@gmail.com>

Terima kasih pak

[Quoted text hidden]

Maria ulfah <ulfah057@gmail.com>

Tue, May 31, 2022 at 3:45 PM


To: Ginanjar Zukhruf Saputri <zukhruf.alparslan@gmail.com>

Dear Author,

Salam,

Kami informasikan bahwa artikel Anda perlu perbaikan, dengan email ini kami lampirkan file yang perlu direvisi dan kami telah memberikan komentar pada file tersebut. Mohon untuk revisi pada file yang telah kami lampirkan dan beri tanda kuning pada bagian yang anda revisi dan mohon kirimkan file Bibtex kepada kami untuk diedit. Kami beri waktu hingga 2 June 2022. Terima kasih banyak atas perhatiannya.

[Quoted text hidden]

 **L21348.docx**
471K

Ginanjari Zukhruf Saputri <zukhruf.alparslan@gmail.com>
To: Maria ulfah <ulfah057@gmail.com>

Fri, Jun 3, 2022 at 3:05 PM

Dear Editorial IJPHS

salam hormat,
berikut kami kirimkan kembali hasil revisi kami.
mohon maaf sebelumnya atas keterlambatan kami ..
adapun hal yang kami revisi kami tandai warna kuning sesuai instruksi

terimakasih


Best Regards,

Ginanjari Zukhruf Saputri.,M.Sc.,Apt

zukhruf.alparslan@gmail.com

Pharmacy Faculty of Ahmad Dahlan University
Yogyakarta, Indonesia

[Quoted text hidden]

 **L21348. rev 3 Juni 2022.docx**
473K

Maria ulfah <ulfah057@gmail.com>
To: Ginanjari Zukhruf Saputri <zukhruf.alparslan@gmail.com>

Tue, Jun 7, 2022 at 8:01 AM

Baik pak terima kasih banyak

[Quoted text hidden]



Ginanjari Zukhruf Saputri <zukhruf.alparslan@gmail.com>

[IJPHS] Proofreading ID 21348

5 messages

Maria ulfah <ulfah057@gmail.com>

Wed, Jun 8, 2022 at 3:15 PM

To: Ginanjari Zukhruf Saputri <zukhruf.alparslan@gmail.com>

Dear Author,

Selamat Sore!!

Berikut kami lampirkan artikel final anda, artikel berikut akan kami publish, dan silahkan dicek kembali jika ada kesalahan pada judul, nama penulis atau isi artikel anda. Karena jika diterbitkan kami tidak menerima perbaikan. **Kami memberi Anda waktu 2x24 jam untuk membalas email ini**, jika Anda tidak membalas maka artikel tersebut akan dinyatakan Anda setuju. terima kas

--

Best Regards,

Maria Ulfah

Editorial Staff on behalf of Editor-in-Chief

Staff International Journal of Public Health Science (IJPHS)

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Pharmacy Faculty of Ahmad Dahlan University

Yogyakarta, Indonesia

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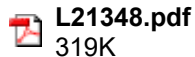
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Mon, Jun 13, 2022 at 9:10 AM

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zukhruf.alparslan@gmail.com
Pharmacy Faculty of Ahmad Dahlan University
Yogyakarta, Indonesia

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To: Ginanjar Zukhruf Saputri <zukhruf.alparslan@gmail.com>

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IJPHS Vol. 11, No. 3 September 2022

1 message

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Fri, Jun 24, 2022 at 9:11 AM

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[IJPHS] Editor Decision

3 messages

Lina Handayani <ijphs@iaescore.com>

Sun, Feb 20, 2022 at 2:08 PM

Reply-To: "Dr. Lina Handayani" <ijphs@iaescore.com>

To: "M.Sc.,Apt Ginanjar Zukhruf Saputri" <zukhruf.alparslan@gmail.com>

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Dear Prof/Dr/Mr/Mrs: M.Sc.,Apt Ginanjar Zukhruf Saputri,

It is my great pleasure to inform you that your paper entitled "EFFECTS OF MODIFIED BRIEF COUNSELING-5A AND RELIGIOUS MOTIVATIONAL SMS ON MEDICATION-TAKING BEHAVIOR AND COMPLIANCE OF DIABETES MELLITUS PATIENTS" is ACCEPTED and will be published on the International Journal of Public Health Science (IJPHS). This journal is accredited SINTA 1 by Ministry of Research and Technology/National Research and Innovation Agency, Republic of Indonesia (RISTEK-BRIN) and has ACCEPTED for inclusion (indexing) in Scopus (<https://suggestor.step.scopus.com/progressTracker/?trackingID=D331D503BA1584BF>) since 2020 issues ([https://www.scopus.com/results/results.uri?src=s&st1=&st2=&sot=b&sdt=b&origin=searchbasic&rr=&sl=57&s=SRCTITLE%20\(International%20Journal%20of%20Public%20Health%20Science\)](https://www.scopus.com/results/results.uri?src=s&st1=&st2=&sot=b&sdt=b&origin=searchbasic&rr=&sl=57&s=SRCTITLE%20(International%20Journal%20of%20Public%20Health%20Science))). Congratulations!

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Ginanjar Zukhruf Saputri.,M.Sc.,Apt

zukhruf.alparслан@gmail.com

Pharmacy Faculty of Ahmad Dahlan University
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Received, thank you.

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Effects of Modified Brief Counseling-5A and Religious Motivational SMS on Medication-Taking Behavior and Compliance of Diabetes Mellitus Patients

Ginanjar Zukhruf Saputri¹, Okta Muthia S², Akrom¹

¹Faculty of Pharmacy, Universitas Ahmad Dahlan, Yogyakarta, Indonesia

²Faculty of Math and Science, University of Lambung Mangkurat, Kalimantan, Indonesia

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ABSTRACT (10 PT)

Compliance with treatment determines whether the therapeutic target of Diabetes Mellitus (DM), that is, blood glucose control, is achieved. Since knowledge of DM management can improve adherence in medication-taking behavior, counseling by pharmacists is believed to contribute to its better acquisition. Nevertheless, many counseling and reminder media are still currently developed. This study was intended to identify the effects of brief counseling with 5A modification and a motivational reminder through short message services (SMS), designed with a religious approach, on medication-taking behavior and adherence among DM outpatients at Jetis 1 Community Health Center, Bantul, Yogyakarta. This quasi-experimental study employed a pretest-posttest control group design, and the data were collected prospectively from the outpatients from May to August 2018. After signing an informed consent form, 72 patients who met the inclusion criteria were divided evenly into two groups, namely the treatment group and the control group. Patients who were pregnant or audibly impaired were excluded. The data acquisition involved interviews using two sets of questionnaires on medication-taking behavior and the Medication Adherence Rating Scale (MARS). The levels of medication-taking behavior and compliance were statistically assessed using the Wilcoxon test. The results showed that brief counseling-5A, combined with religious motivational SMS, raised the stage of behavior change in DM patients. There were increases (Δ) in medication-taking behavior by 2.76 ± 1.59 and patient compliance by 3.44 ± 3.45 . In conclusion, brief counseling-5A by pharmacists and motivational text reminders can improve the medication-taking behavior and compliance of DM patients with the therapy.

Keywords: diabetes, counseling, short messages, medication-taking behavior, compliance

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Corresponding Author:

Yu-Tzu Wu

EACH: The Centre for Research in Ageing and Cognitive Health, University of Exeter

South Cloisters, St Luke's Campus, Exeter, EX1 2LU, United Kingdom

Email: Y.Wu3@exeter.ac.uk

Commented [H4]: Please add Corresponding Author

1. INTRODUCTION

The International Diabetes Federation (IDF) states that, in 2015, up to 415 million people from the age range of 20-79 years suffered from diabetes mellitus (DM), and 10 million of them were Indonesian [1].

DM management comprises lifestyle modification, regular drug administration, and routine doctor visits as part of health control[2]. The ultimate purpose is to control blood glucose levels and improve the quality of life of DM patients[3,4]. However, blood sugar control may not be optimal because of several factors, including inadequate knowledge and low medication adherence [5].

Previous studies have shown that counseling by pharmacists significantly shapes the outcome of the treatment of diabetes mellitus patients [6],[5],[7],[8]. Mulyanti (2014) claims that brief counseling by pharmacists can help to improve medication-taking behavior by 24.58%, adherence to medication by 10%, and the quality of life of DM-hypertensive patients at a district hospital in Panembahan, Bantul by 5.89% [9]. Thakkar *et al.* (2016) suggest that in addition to counseling, sending short messages to patients with chronic diseases can raise their compliance from 50% to 67.8% (17.8% increase). Also, the other advantages are that SMS is easy to use and can deliver information immediately with unlimited coverage [10].

Brief counseling-5A is a modified model of brief counseling by pharmacists. Combined with a text reminder to hypertensive patients, it has been reported to exhibit a positive outcome, that is, improved quality of life [11]. A further investigation in Saputri *et al.* (2019) reveals that the levels of behavior of the treatment group 1 (brief counseling-5A) and treatment group 2 (brief counseling-5A + motivational SMS) have more significant proportions (21.2% each) than that of the control group (12.1%) [12].

For the reasons above, brief counseling by pharmacists and motivational reminder via SMS positively contribute to the successful treatment of hypertensive diabetic inpatients. Nevertheless, there is still a lack of research on both types of intervention at community health centers. In Indonesia, primary medical care serves as the first destination of referral for, among others, DM patients and is offered in level-1 facilities, such as community health centers. According to the Health Profile of Bantul Regency, diabetes is included in the top 10 diseases at the community health centers and the number of visits has increased compared to the previous year [3]. Jatis 1, Bantul community health centers showed the higher visit rates for diabetic patients. The high number of patient visits causes time constraints in the interaction between patients and the pharmacy. Based on the ADA (2018), diabetic patients are patients who need to be counseled by pharmacists regarding their treatment. Brief counseling is recommended in implementing health behavior change counseling in primary health facilities such as community health centers.

Therefore, a study of brief counseling by pharmacists, together with motivational reminders via text messages, for DM outpatients at community health centers becomes necessary. This study develops the brief counseling-5A model and combines it with motivational SMS. Aside from diabetes mellitus and its treatment, counseling incorporates religious aspects. Through a systematic review, Darvyri *et al.* (2018) propose that religion or religiosity contributes to the efficacy of type-2 diabetes treatment as it helps in achieving better blood sugar control [13].

2. METHOD (10 PT)

Explaining research chronological, including research design, research procedure (in the form of algorithms, Pseudocode or other), how to test and data acquisition [5]–[7]. The description of the course of research should be supported references, so the explanation can be accepted scientifically [3], [4] Figures 1-2 and Table 1 are presented center, as shown below and cited in the manuscript [5], [8]–[13]. Figure 2. Religiosity, spirituality and subjective well being according sex. The graph gender of religiosity has been illustrated in Figure 2(a) and graph of spiritualit has been illustrated in Figure 2(b).

This study has been approved by the Ethics Committee of Ahmad Dahlan University (KEP UAD) with EC No. 011802025. It employed a quasi-experimental technique, particularly randomized pretest-posttest design with control and treatment groups. The control group underwent the usual care, while the treatment group received brief counseling-5A and motivational SMS. The data were collected prospectively and by filling out the questionnaires and health assessment sheets.

Instruments

The content of the brief counseling-5A model was redeveloped for DM patients and to incorporate a religious approach. It refers to a previous study on Brief Counseling-5A for Patients with DM-Hypertension [12]. The modified brief counseling-5A was a pharmaceutical intervention that was delivered in a focus group discussion (FGD). In this study, the questionnaire on medication-taking behavior was developed from a previous

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study, i.e., Saputri et al. (2019), by adjusting the content to the research subject, namely DM patients. The next step was validity testing by experts like doctors, pharmacists, and clinical psychologists [12].

The questionnaire on medication-taking behavior measures the cognitive, affective, and psychomotor domains of patients in the treatment. Correct answers were scored with +1, whereas the wrong ones were assigned with 0. As for questionnaire item No. 12, score 0 meant "yes", while 1 represented "no, never". The measurement results were then categorized into several stages of change in medication-taking behavior, namely pre-contemplation, contemplation, preparation, and action.

The validity and reliability tests of the first questionnaire, i.e., medication-taking behavior, involved 41 patients who had met the inclusion criteria. The former produced $r_{count} > 0.308$ for each question, while the latter yielded Cronbach's alpha of 0.738. Meanwhile, the second questionnaire that measured patient compliance adopted the Medication Adherence Rating Scale (MARS). Involving 25 in-patients with diabetes mellitus, Alfian & Putra (2017) analyze the validity and reliability of the MARS questionnaire and produce r_{count} ranging from 0.682 to 0.829 ($r > 0.396$) and Cronbach's alpha of 0.803 (≥ 0.70). In other terms, the two sets of questionnaires are valid and reliable for the measurement of medication-taking behavior and compliance among DM patients [14].

The reminder was a modified short message from the one used in Saputri et al. (2019) and Adikusuma (2018), with the addition of religious content [12],[15]. The researchers sent it by Short Messages Service (SMS) or WhatsApp messenger (WA) for one month (30 days) every morning or evening to remind patients to take their medication on time. Modification on the content of the motivational text was reviewed by doctors, pharmacists, and clinical psychologists.

Subjects

The research subjects who had fulfilled the inclusion criteria were evenly divided into two groups, namely the control group (receiving the usual care from the pharmacists at the community health center) and the treatment group (receiving brief counseling-5A and motivational SMS from the researchers). The inclusion criteria were outpatients at Jetis 1 community health center aged 18 years old and diagnosed with type 2 diabetes mellitus (DM) with or without comorbidities during the research period. Also, they had to receive at least one oral anti-diabetic drug in the past three months, have and be able to use mobile phones (read and reply to messages), and be willing to participate in the research by signing an informed consent form. Meanwhile, the exclusion criteria were pregnancy and hearing impairment. Some patients were categorized as lost to follow-up due to incomplete participation, withdrawal from the study, and death.

The control group underwent the usual care from the pharmacists at the community health center, while the treatment group received the modified brief counseling-5A and motivational reminder in the form of short messages. Before (pretest, first meeting) and after (posttest, second meeting) these treatments, the medication-taking behavior and compliance of the respondents were assessed.

Statistical Analysis

The validity test used Pearson's correlation coefficient, while the reliability (consistency) test was based on Cronbach's alpha. The Wilcoxon test aimed to identify the presence or absence of shifts in the stages of medication-taking behavior before and after the intervention (significant $p < 0.05$) and quantify the average scores of patient's medication-taking behavior and compliance.

3. RESULTS AND DISCUSSION

A total of 72 patients met the inclusion criteria and were randomly divided into two groups, namely control ($n = 36$) and treatment ($n = 36$). Thirty-four (34) patients in the treatment group participated until the end of the research, whereas the other two were categorized into lost to follow-up as they were outside the study site.

The demographic characteristics of these respondents are presented in Table 1. The majority of the patients in the treatment group were ≤ 55 years old (61.1%), whereas those in the control group were mostly > 55 years old (69.4%). In both groups, women were dominant, i.e., 75% in the control group and 72.2% in the treatment group. Most respondents undertook ≤ 12 years of education, and a large proportion of them was unemployed. Almost all respondents had comorbidities but no family history of DM. In the treatment group, more than half of the patients had a history of DM for ≤ 5 years (58.3%). On the contrary, 52.8% of the respondents in the control group had to deal with DM for > 5 years. A higher number of patients in both groups practiced glucose/carbohydrate diet and had exercise habits.

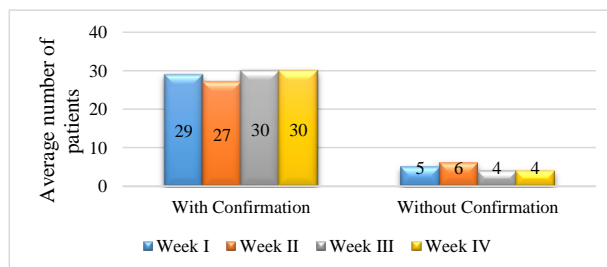
Brief counseling by pharmacists was delivered depending on the assessment results of the respondents' condition, i.e., stages of behavior change. The average time of the brief counseling was 27.84 ± 6.78 minutes (mean \pm SD). Sending the SMS means supporting said counseling, which took place in categorically limited time. Also, the SMS contained motivational reminders that helped patients to remember taking their medicine while receiving encouragement to continue the treatment.

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Table I. The characteristics of diabetic patients in the control and treatment groups at Jetis 1 Community Health Center, Bantul from May to August 2018

No	Characteristics	Control Group		Treatment Group		
		Frequency	Percentage (%)	Frequency	Percentage (%)	
	Total	36	100	36	100	
1	Age	≤55 years old	11	30,6	22	61,1
		>55 years old	25	69,4	14	38,9
2	Sex	Male	9	25	10	27,8
		Female	27	75	26	72,2
3	Education	≤12 years	33	91,7	29	80,6
		>12 years	3	8,3	7	19,4
4	Occupation	Employed	14	38,9	17	47,2
		Unemployed	22	61,1	19	52,8
5	Comorbidity	Yes	27	75	23	63,9
		No	9	25	13	36,1
6	Family History of DM	Yes	16	44,4	18	50
		No	20	55,6	18	50
7	Duration of DM	≤5 years	17	47,2	21	58,3
		>5 years	19	52,8	15	41,7
8	Anti diabetic oral	Monotherapy	22	61,1	17	47,2
		Combination	14	38,9	19	52,8
9	Excercise	No	24	66,7	29	80,6
		Yes	12	33,3	7	19,4
10	Diet glucose/ carbohydrat	No	3	8,3	10	27,8
		Yes	33	91,7	26	72,2
11	IMT	<25 kg/m ²	24	66,7	19	52,8
		≥25 kg/m ²	12	33,3	17	47,2
12	Medication-taking behavior	Mean ± SD		8,78 ± 2,29		
13	Compliance	Mean ± SD		22,17 ± 2,76		
14	Fasting blood sugar level	Mean ± SD (mg/dL)		192,84 ± 75		
				188,41 ± 65,57		

Short messages were sent for approximately 30 days, with the following details: sent daily for the first two weeks and, then, every three days in the next two weeks. A total of 18 patients received motivational text via WhatsApp messenger, while the other 16 patients via SMS. After receiving short messages, patients were encouraged to confirm. The average number of those who did is presented in Figure 1.

**Figure 1.** The number of diabetic patients at Jetis 1 Community Health Center in Bantul who confirmed after receiving motivational reminders from May to August 2018

Notes:

- Week I: the short messages were sent daily
- Week II: the short messages were sent daily
- Week III: the short messages were sent every three days
- Week IV: the short messages were sent every three days
- Total: 34 patients

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The above graph shows that most patients responded to motivational text reminders. In the second week, in which the short messages were sent daily, the number of received confirmations decreased from 29 to 27 patients. On the contrary, in the third and fourth weeks, this number did not experience any decrease. In other words, all patients in the third week continued to confirm that they had received the text reminders that were sent every three days until the last week. The time that they took to reply was around 20-120 minutes.

Based on Mann Whitney's analysis results, there was no statistically significant difference in the number of confirmations between the motivational text reminders sent every day and every three days ($p>0.05$). It indicates that the total confirmation received in Week I-II and Week III-IV is categorically similar. Based on this, the level of patient response between giving motivational reminder messages both when giving motivational reminder messages every day, and every 3 days can be taken into consideration in the preparation of intervention media in future studies. It is still necessary to develop an intervention model such as an e-reminder application based on a mobile health application that can practically show the patient's response.

One of the processes in brief counseling-5A is assessment, which involves assessing the condition of patients to determine their level of readiness to behavior change. Brief counseling by pharmacists was delivered based on the stage of transformations in medication-taking behavior. ACPM (2009) proposes four steps of behavior change, namely pre-contemplation, contemplation, preparation, and action. After brief counseling by pharmacists, the target patients were expected to show a step-up to the next stage, as well as a higher score of medication-taking behavior [16]. The steps of behavior change of the control and treatment groups are summarized in Table II.

Table II. The stages of behavior change of diabetic patients belonging to the control and treatment groups at Jetis 1 Community Health Center in Bantul from May to August 2018, as observed in the first (pretest) and second (posttest) meeting

Stage of behavior change	Pretest		Posttest		p-value
	N	%	N	%	
Control Group					
Pre-contemplation	30	83,3	29	80,6	0,773
Contemplation	1	2,8	3	8,3	
Preparation	4	11,1	4	11,1	
Action	1	2,8	0	0	
Intervention Group					
Stage of behavior change	Pre test		Post test		p-value
	N	%	N	%	
Pre-contemplation	32	88,9	10	27,8	0,000**
Contemplation	3	8,3	0	0	
Preparation	1	2,8	13	36,1	
Action	0	0	11	30,6	

The Wilcoxon test; a decrease in behavior change in 4 respondents, a constant stage in 28 respondents, and an increase in 4 respondents.

P-value: the significance between the pretest-posttest results of each group; (**) marks a significant difference

The Wilcoxon test revealed that the stages of change in medication-taking behavior varied among the patients in the control group. As many as four (4) respondents showed a decrease, 28 patients did not experience any changes in their behavior, and another four (4) respondents exhibited an increase. Based on the test results, there were no significant shifts (neither increase nor decrease) in the stage of behavior change in this group ($p>0.05$). This finding is in line with Muthoharoh (2017) [17].

Combining brief counseling by pharmacists with motivational text reminders theoretically encourages improvement in patient's medication-taking behavior. The different behaviors that the patients exhibited in the first and second visits are presented in Table III.

Table III. The score of medication-taking behavior of diabetic patients at Jetis 1 Community Health Center from May to August 2018, as observed in the first (pretest) and second (posttest) meeting

Groups	Pretest	Posttest	Δ mean of posttest-pretest	p-value
Control	8.78 \pm 2.29	8.81 \pm 2.03	0.02 \pm 1.66	0.744
Treatment	8.11 \pm 1.94	10.88 \pm 1.22	2.76 \pm 1.59	0.000**

The Wilcoxon test results, the data are presented in mean \pm SD

P-value: the significance between the pretest-posttest results of each group; (**) marks a significant difference

The Wilcoxon test of the control group proved that the scores of medication-taking behaviors measured in the pretest and posttest were insignificantly different ($p>0.05$). Accordingly, the patients included

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in this group exhibited no behavior improvement. On the contrary, the treatment group showed a significant increase in behavior between the pretest and the posttest ($p < 0.05$). This outcome is potentially caused by brief counseling-5A that has led to an increase in knowledge or understanding of proper treatment. Notoatmodjo (2012) believes that, theoretically, behavior change through the process of knowledge transformation is followed by attitudes and, then, behavior change. Moreover, Swaroop et al. (2016) have reported that counseling by pharmacists can improve patients' knowledge about the disease and its treatment and, consequently, affect the attitudes, as well as practices, of said patients toward the disease [18],[19].

As a conclusion, the medication-taking behavior score of patients significantly increases after receiving modified brief counseling-5A and motivational text reminders. In other terms, these interventions positively affect diabetes treatment.

An increase in medication-taking behavior can shape overall patient compliance with treatment. The patient compliance, as measured with the MARS questionnaire, is presented in Table IV [12].

Table III. The scores of compliances with drug administration procedure among DM patients at Jetis 1 Community Health Center, Bantul, as measured using the MARS questionnaire in the first (pretest) and second (posttest) visits

Groups	Pretest	Posttest	Δ mean of posttest-pretest	<i>p</i> -value
Control	22.17±2.76	22.86±2.60	0.69±2.09	0.744
Treatment	20.83±3.31	24.18±1.73	3.44±3.45	0.000**

The Wilcoxon test results, the data are presented in mean±SD

P-value: the significance between the pretest-posttest results of each group; (**) marks a significant difference

The Wilcoxon test results proved that the compliance scores between the first and second visits were insignificantly different ($p > 0.05$). It indicates the absence of an increase in patient adherence. Conversely, in the treatment group, the pretest and posttest scores were significantly different ($p < 0.05$), meaning that the patient adherence to medication improves.

These results correspond with several previous studies. For instance, providing brief counseling and motivational text reminders to patients with chronic diseases has been reported to positively improve adherence to medication [9],[20]. Also, brief counseling by pharmacists has been confirmed as an effective method of increasing patient compliance. Furthermore, sending motivational text reminders can raise patients' awareness and, by proxy, adherence [20].

With the pill count, the percentage of compliance was obtained. Pill count was conducted after the intervention was completed (i.e., posttest). This technique measures patient compliance with medication and offers an objective result as a part of its advantages.

Based on the pill count, there were differences in patient compliance with medication. Patients possibly still had several anti-diabetic drugs from the previous month (before the research), which then affected the compliance score measured in the following month (during the research).

Meanwhile, based on the MARS questionnaire, patients showed improved compliance with medication after receiving brief counseling by pharmacists and motivational text reminders. This finding confirms that pharmacists play a crucial role in the treatment of diabetic patients.

Table IV. The compliance (%) of DM patients with medication based on pill count in the first (pretest) and second (posttest) visits

	Control Group	Treatment Group	<i>p</i> -value
Mean percentage of patient compliance with medication	69.64±27.66	83.63±16.59	0.096

The Wilcoxon test results, the data are presented in mean±SD

P-value: the significance between the mean percentages of patient compliance in the two groups

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Based on this study, the provision of brief pharmacist counseling accompanied by a motivational reminder message can contribute to the treatment of diabetes mellitus patients. Motivational text reminder messages sent via WA or SMS can improve treatment behavior and medication adherence in the treatment group ($p < 0.05$). However, the results of the matching between the level of adherence based on the MARS questionnaire with the physical amount of the drug (pill count) are still a limitation in this study, indicated by the p value > 0.05 .

The role of pharmacist education based on text messages using either the WA or SMS platform shows one of the educational models that is quite affordable in terms of cost. This is in line with Haidar Rabia's research (2019) showed that text message-based education is effective in improving DM management, both lifestyle management and medication adherence [21]. In the other hands, pharmacist counselling also improve controlling blood sugar level and increase the quality of life of diabetic patients [22]. Further research is needed regarding the development of pharmacist intervention models related to educational media and digital literacy-based medication reminder messages. Opportunities in using smartphone apps-based e-health showed that they are quite effective in managing DM patients, especially increasing compliance [23].

Education related to lifestyle, both medication adherence, diet management, is needed in the management of diabetes mellitus [24]. Several factors such as low adherence, inadequate support and motivation in the disease management, can contribute to uncontrolled blood glucose levels of patients [25]. The intervention in the form of technology-based education is considered to be able to improve diabetes therapy management. One of them is m-health education based on text messages. The provision of a text message-based reminder intervention showed that it was able to increase the adherence of DM patients, this is in line with the research of Arao et al (2017) [25] [26].

The other factors that influence medication adherence are perception of illness, health literacy, self-efficacy and psychosocial factors, both personal and cultural beliefs. This is associated with the aspect of religiosity [27]. In this study, a motivational message was given which included a religious message. Lifestyle settings in the form of diet in the management of diabetes mellitus are associated with religious, family, psychosocial, financial and personal factors. The ADA states that the dietary management of DM patients also takes into account the culture of the population and religion. Although in the study of Katsaridis Savvas et al (2020) it showed that Muslims and Christians did not show significant differences regarding adherence to dietary behavior management [24]. Research related to religious coping conducted by Maguna Made et al (2021) showed that there was a significant relationship between religious coping and medication adherence also quality of life [28]. Based on this data that religious motivational messages can contribute to medication adherence and management of the lifestyle or behavior of DM patients.

The provision of repeated interventions such as reminder messages and educational messages was shown to be more effective in increasing compliance and changing behavior. Ang li (2020) showed that patient compliance was higher in the group that was given the SMS reminder intervention 5 times per week than 3 times per week [29]. In addition, patient-centered care (PCC) recommend several things to improve patient therapy adherence, including increasing understanding of health literacy, simplifying therapy (avoiding polypharmacy), communication and motivation from health workers, increasing social support, and maximizing the use of technology in educational interventions and reminders [30].

4. CONCLUSION

The combination of modified brief counseling-5A by pharmacists and motivational text reminders containing religious aspect triggers a positive transformation (Δ) in the stage of behavior change (by 2.76 ± 1.59) and compliance of DM patients with medication (by 3.44 ± 3.45). For this reason, such combination plays a positive role in diabetes therapy management.

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REFERENCES












- [1] Huang, Y., Ogurtsova, K., Fernandes, R., Cavan, D., Makaroff, L., Shaw, J., Cho, N., 2017. International Diabetes Federation Diabetes Atlas estimates for the global diabetes prevalence of adults aged 18 to 99 years. *IDF*, 1.
- [2] WHO, 2017. Diabetes. Diambil dari <http://www.who.int/news-room/fact-sheets/detail/diabetes> <http://www.who.com/diabetes.html>, diakses tanggal 5 Februari 2018.
- [3] Depkes, 2005. *Pharmaceutical care untuk penyakit Diabetes Mellitus*. Departemen Kesehatan RI, Jakarta, 10-74.
- [4] ADA, 2018. Standards of Medical Care in Diabetes - 2018. *J Clin and App Res Edc : Diabetes Care*, 39, 13-50.

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- [5] Chow, E.P., Hassali, M.A., Saleem, F., Aljadhey, H., 2016. Effects Of Pharmacist-led Patient Education On Diabetes-Related Knowledge And Medication Adherence: A Home-Based Study. *Health Educ J*, 1 (13), 1–13.
- [6] Al Mazroui, N.R., Kamal, M.M., Ghabash, N.M., Yacout, T.A., Kole, P.L., McElnay, J.C., 2009. Influence of pharmaceutical care on health outcomes in patients with Type 2 diabetes mellitus. *Br J Clin Pharmacol*, 67 (5), 547–557.
- [7] Shareef, J., Fernandes, J., Samaga, L., Bhat, 2016b. Evaluating the Effect of Pharmacist's Delivered Counseling on Medication Adherence and Glycemic Control in Patients with Diabetes Mellitus. *J Diabetes & Metab* 7 (3), 3-4
- [8] Swaroop, A.M., Varghese, C., Jose, J., 2016. Patient Counseling On Knowledge, Attitude, Practice and Medication Adherence Type 2 Diabetes Mellitus Patients. *EJPMR* 3, 231–235.
- [9] Mulianti, R., 2014. Pengaruh Brief Counseling dan Short Message Service (SMS) Terhadap Tingkat Perilaku Adhrens, Kepatuhan Minum Obat dan Hasil Terapi Pasien Diabetes Mellitus Dengan Hipertensi Rawat Jalan Poliklinik Penyakit Dalam RSUD Panembahan Senopati Bantul Yogyakarta. *Tesis*. Fakultas Farmasi Universitas Ahmad Dahlan, Yogyakarta.
- [10] Thakkar, J., Kurup, R., Laba, T., Santo, K., Thiagalangam, A., Rodgers, A., 2016. Mobile Telephone Text Messaging for Medication Adherence in Chronic Disease A Meta-analysis. *JAMA Internal Medicine*, 176, 340–349.
- [11] Saputri, Z.G., 2013. Pengaruh Pemberian SMS Sebagai Pengingat Dan Motivasi Serta Konseling Farmasi Pasien Hipertensi Di Poliklinik Penyakit Dalam RS PKU Muhammadiyah Bantul. Paskasarjana Farmasi Universitas Ahmad Dahlan, Yogyakarta
- [12] Saputri, Ginanjar, et al. 2019. Efek Konseling Menggunakan Brief Counseling 5A Modifikasi Disertai Pesan Motivasional Farmasi dalam Peningkatan Perilaku dan Outcome Klinik Pasien Diabetes Melitus dengan Hipertensi Rawat Jalan di RSUD Panembahan Senopati, Bantul. *Jurnal Farmasi Klinik Indonesia*, Maret 2019. Vol. 8 No. 1, hlm 31–41
- [13] Darvyri, P., Christodoulakis, S., Galanakis, M., Avgoustidis, A.G., Thanopoulou, A., Chrousos, G.P., 2018. On the Role of Spirituality and Religiosity in Type 2 Diabetes Mellitus Management—A Systematic Review. *Sci Res Pubh Psychology*, 9 (4), 728–744.
- [14] Alfian, R., Putra, A.M.P., 2017. Uji Validitas Dan Reliabilitas Kuesioner Medication Adherence Report Scale (MARS) Terhadap Pasien Diabetes Mellitus. *JHS*, 2 (2), 176-183
- [15] Adikusuma, W., 2018. Adherence level and blood sugar control of type 2 diabetes mellitus patients who gets counseling and short messages service as reminder and motivation. *AJPCR*, 11 (2), 219–222.
- [16] ACPM, 2009. *Coaching And Counseling Patients A Resource From The American College Of Preventive Medicine*. American College Of Preventive Medicine.
- [17] Muthoharoh, A., 2017. Pengaruh Brief Counseling 5A Dan Pesan Motivatif Dalam Meningkatkan Kualitas Hidup Pasien Diabetes Mellitus Dengan Hipertensi Rawat Jalan Poliklinik Penyakit Dalam Di RSUD Panembahan Senopati Bantul. *Tesis*. Fakultas Farmasi Universitas Ahmad Dahlan, Yogyakarta
- [18] Notoatmodjo, S., 2012. *Promosi Kesehatan dan Ilmu Perilaku*. Rineka Cipta, Jakarta, 132-148.
- [19] Swaroop, A.M., Varghese, C., Jose, J., 2016. Patient Counseling On Knowledge, Attitude, Practice and Medication Adherence Type 2 Diabetes Mellitus Patients. *EJPMR* 3, 231–235.
- [20] Nurwijayanti, A., 2015. Brief Counseling and Mobile Phone Short Message Service (SMS) Increase Patient Compliance. *Int J Pharm Med Bio Sci* 4 (3), 175–179.
- [21] Haidar Rabbia, Likhitha Sudini, Clara K, N Wah C. 2019. Mobile phone text messaging in improving glycaemic control for patients with type 2 diabetes mellitus: A systematic review and meta-analysis. *Diabetes Research and Clinical Practice*. Volume 150, April 2019, Pages 27-37
- [22] Muthia, Okta S, Ginanjar, and Akrom. 2022. Diabetes mellitus patients' fasting blood sugar levels and quality of life following brief pharmacist counseling with reminders and motivational messages. *International Journal of Basic & Clinical Pharmacology*. Jan;11(1):13-19
- [23] Huang Zhilian, Elaine L, Geronimo J, Monika S, Peter S, dan Josip C. 2019. Medication management support in diabetes: a systematic assessment of diabetes self-management apps. *BMC Medicine*. 17:127
- [24] Katsaridis Savvas, Maria G, Konstantinos, Christos T, Stefanos T, Anastasia G, et al. Low Reported Adherence to the 2019 American Diabetes Association Nutrition Recommendations among Patients with Type 2 Diabetes Mellitus, Indicating the Need for Improved Nutrition Education and Diet Care. *Nutrients* 2020, 12, 3516
- [25] Ashrafzadeh Sahar dan Osama hamdy. Patient-Driven Diabetes Care of the Future in the Technology Era. *Cell Metabolism*, 2019. Vol 29, issue 3, pages 564-575
- [26] R.K. A Rao, M.Y. O'Connor, T. Barrett, L. Chockalingam, F. Khan, A. Kumar, et al. Strengthening value-based medication management in a free clinic for the uninsured: quality interventions aimed at reducing costs and enhancing adherence. *BMJ Open Qual.*, 6 (2017), p. e000069
- [27] Shahin Wejdan, Gerard A dan Ieva S. The impact of personal and cultural beliefs on medication adherence of patients with chronic illnesses: a systematic review. *Dove Press journal: patient Preference and Adherence*. 2019:13 1019–1035
- [28] Mahaguna Made, Kadek Siki, dan Ni Yoman A. RELIGIOUS COPING, MEDICATION ADHERENCE AND QUALITY OF LIFE FOR DIABETES MELLITUS PATIENTS. *Indonesian Journal of Community Health Nursing*. Vol 6, No 1. February 2021
- [29] Li Ang, Michelle Cunich, Nicholas F, Katrina P, Allannah F, and Ian C. Improving Adherence to Weight-Loss Medication (Liraglutide 3.0 mg) Using Mobile Phone Text Messaging and Healthcare Professional Support. *Obesity Journal*. 2020. Vol 28
- [30] R Martin Leslie, Cheyene Feig, Chole RM, Kenrick W, dan Kate F. A perspective on nonadherence to drug therapy: psychological barriers and strategies to overcome nonadherence. *Dove press. Patient Preference and Adherence*. 2018:12 1527–1535

BIOGRAPHIES OF AUTHORS

	<p>Ginanjar Zukhruf Saputri   is a lecturer on Pharmacy Faculty of Universitas Ahmad Dahlan, Indonesia. She has interest research topics about clinical pharmacy, social and community pharmacy, especially about development of pharmaceutical care intervention such us counseling method using Brief Conseling 5A, and improving adherence of medication using reminder and motivational messages in hypertension and Diabetes Mellitus patients. She can be contacted at email: zukhruf.alparslan@gmail.com</p>
	<p>Akrom     is a lecturer in Pharmacology and Clinical Pharmacy on Faculty Pharmacy, Universitas Ahmad Dahlan, Indonesia. His interest research topics are about imunopharmacology, pharmacoepidemiology biomelecular, and about evidence based medicine. He also focused on pytomedicine immunopharmacology, chemopreventive immunopharmacology, health technology asesment and medication error in the hospital and primary health care, the development of pharmaceutical care intervention method for chronic disease (asthma, hypertension, diabetes, COPD, and HIV-AIDS), and about survey on smoking as a risk factor for chronic diseases. He can be contacted at email: akrom@pharm.uad.ac.id</p>
	<p>Okta Muthia Sari   is a lecturer in Pharmacy Study Program of Faculty of Mathematics and Natural Sciences, Lambung Mangkurat University, Banjarbaru, Indonesia. She has interest topics about social and community pharmacy, also clinical pharmacy. Her research about development of counseling method, adherence of medication and quality of life of hypertension and diabetes mellitus patient. She can be contacted at email: muthiaoktasari@gmail.com</p>

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Comments to the Authors (how to improve this paper)::

1. discussion: what about respondents who did not provide confirmation?
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2. why is this the result of this research? what factors cause it?

3. does it mean that the intervention provided is not in accordance with the respondent's needs?

4. what are the implications of the results of this study in future research?

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Modified brief counseling-5A, motivational SMS on medication-taking behavior and compliance among diabetic patients

Ginanjar Zukhruf Saputri¹, Okta Muthia Sari², Akrom Akrom¹

¹Department of Clinical Pharmacy, Faculty of Pharmacy, Universitas Ahmad Dahlan, Yogyakarta, Indonesia

²Department of Clinical Pharmacy; Faculty of Math and Science, University of Lambung Mangkurat, Kalimantan, Indonesia

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ABSTRACT

Knowledge of diabetes mellitus (DM) management can improve adherence in medication-taking behavior. Counseling by pharmacists is believed to contribute to its better acquisition. Nevertheless, many counseling and reminder media are still currently developed. This study aimed to identify the effects of brief counseling-5A modification and a motivational reminder through short message services (SMS), designed with a religious approach, on medication-taking behavior and adherence among DM outpatients at Jetis 1 Community Health Center, Bantul, Yogyakarta, Indonesia. This quasi-experimental study employed a pretest-posttest control group design. Data were collected prospectively from May to August, 2018. There were 72 patients who met the inclusion criteria divided evenly into two groups, the treatment group and the control group. The data collected by interviews using questionnaires on medication-taking behavior and the medication adherence rating scale (MARS) and were statistically assessed using the Wilcoxon test. The results showed that brief counseling-5A, combined with religious motivational SMS, raised the stage of behavior change in DM patients. There were increases (Δ) in medication-taking behavior by 2.76 ± 1.59 and patient compliance by 3.44 ± 3.45 . In conclusion, brief counseling-5A by pharmacists and motivational text reminders can improve the medication-taking behavior and compliance of DM patients with the therapy.

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Corresponding Author:

Ginanjar Zukhruf Saputri

Department of Clinical Pharmacy, Faculty of Pharmacy, Universitas Ahmad Dahlan

Jl. Prof. DR. Soepomo Sh, Warungboto, Umbulharjo, Yogyakarta, Indonesia

Email: zukhruf.alparslan@gmail.com

1. INTRODUCTION

The International Diabetes Federation (IDF) states that, in 2015, up to 415 million people from the age range of 20-79 years suffered from diabetes mellitus (DM), and 10 million of them were Indonesian [1]. DM management comprises lifestyle modification, regular drug administration, and routine doctor visits as part of health control [2]. The ultimate purpose is to control blood glucose levels and improve the quality of life of DM patients [3], [4]. However, blood sugar control may not be optimal because of several factors, including inadequate knowledge and low medication adherence [5].

Previous studies have shown that counseling by pharmacists significantly shapes the outcome of the treatment of diabetes mellitus patients [5]–[8]. Previous study claims that brief counseling by pharmacists can help to improve medication-taking behavior, and adherence to medication. It also improve the quality of life among DM-hypertensive patients [9]–[12].

Thakkar *et al.* suggest that in addition to counseling, sending short messages to patients with chronic diseases can raise their compliance from 50 to 67.8% (17.8% increase). Also, the other advantages are that short message services (SMS) is easy to use and can deliver information immediately with unlimited coverage [13]. Brief counseling-5A is a modified model of brief counseling by pharmacists. Combined with a text reminder to hypertensive patients, it has been reported to exhibit a positive outcome, that is, improved quality of life [9], [10]. A further investigation in Saputri *et al.* reveals that the levels of behavior of the treatment group 1 (brief counseling-5A) and treatment group 2 (brief counseling-5A+motivational short message services (SMS)) have more significant proportions (21.2% each) than that of the control group (12.1%) [9]. For the reasons above, brief counseling by pharmacists and motivational reminder via SMS positively contribute to the successful treatment of hypertensive diabetic inpatients. Nevertheless, there is still a lack of research on both types of intervention at community health centers.

In Indonesia, primary medical care serves as the first destination of referral for, among others, DM patients and is offered in level-1 facilities, such as community health centers. According to the Health Profile of Bantul Regency, diabetes is included in the top 10 diseases at the community health centers and the number of visits has increased compared to the previous year [3]. Jetis 1, Bantul community health center showed the higher visit rates for diabetic patients. The high number of patient visits causes time constraints in the interaction between patients and the pharmacy. Based on the American Diabetes Association (ADA) [4], diabetic patients are patients who need to be counseled by pharmacists regarding their treatment. Brief counseling is recommended in implementing health behavior change counseling in primary health facilities such as community health centers. Therefore, a study of brief counseling by pharmacists, together with motivational reminders via text messages, for DM outpatients at community health centers becomes necessary. This study develops the brief counseling-5A model and combines it with motivational SMS. Aside from diabetes mellitus and its treatment, counseling incorporates religious aspects. Through a systematic review, Darvyri *et al.* propose that religion or religiosity contributes to the efficacy of type-2 diabetes treatment as it helps in achieving better blood glucose control [14].

2. RESEARCH METHOD

This study has been approved by the Ethics Committee of Ahmad Dahlan University (KEP UAD) with EC No. 011802025. It employed a quasi-experimental technique, particularly randomized pretest-posttest design with control and treatment groups. The control group underwent the usual care, while the treatment group received brief counseling-5A and motivational SMS. The data were collected prospectively and by filling out the questionnaires and health assessment sheets.

2.1. Instruments

The content of the brief counseling-5A model was redeveloped for DM patients and to incorporate a religious approach. It refers to a previous study on brief counseling-5A for Patients with DM-Hypertension [9]. The modified brief counseling-5A was a pharmaceutical intervention that was delivered in a focus group discussion (FGD). In this study, the questionnaire on medication-taking behavior was developed from a previous study, i.e., Saputri *et al.* by adjusting the content to the research subject, namely DM patients. The next step was validity testing by experts like doctors, pharmacists, and clinical psychologists [9].

The questionnaire on medication-taking behavior measures the cognitive, affective, and psychomotor domains of patients in the treatment. Correct answers were scored with +1, whereas the wrong ones were assigned with 0. As for questionnaire item No. 12, score 0 meant “yes”, while 1 represented “no, never”. The measurement results were then categorized into several stages of change in medication-taking behavior, namely pre-contemplation, contemplation, preparation, and action.

The validity and reliability tests of the first questionnaire, i.e., medication-taking behavior, involved 41 patients who had met the inclusion criteria. The former produced $r_{count} > 0.308$ for each question, while the latter yielded Cronbach's alpha of 0.738. Meanwhile, the second questionnaire that measured patient compliance adopted the medication adherence rating scale (MARS). Involving 25 in-patients with diabetes mellitus, Alfian and Putra analyze the validity and reliability of the MARS questionnaire and produce r_{count} ranging from 0.682 to 0.829 ($r > 0.396$) and Cronbach's alpha of 0.803 (≥ 0.70). In other terms, the two sets of questionnaires are valid and reliable for the measurement of medication-taking behavior and compliance among DM patients [15].

The reminder was a modified short message from the one used in Saputri *et al.* and Adikusuma, with the addition of religious content [9], [16]. The researchers sent it by SMS or WhatsApp messenger (WA) for one month (30 days) every morning or evening to remind patients to take their medication on time. Modification on the content of the motivational text was reviewed by doctors, pharmacists, and clinical psychologists.

2.2. Subjects

The research subjects who had fulfilled the inclusion criteria were evenly divided into two groups, namely the control group (receiving the usual care from the pharmacists at the community health center) and the treatment group (receiving brief counseling-5A and motivational SMS from the researchers). The inclusion criteria were outpatients at Jetis 1 community health center aged 18 years old and diagnosed with type 2 DM with or without comorbidities during the research period. Also, they had to receive at least one oral anti-diabetic drug in the past three months, have and be able to use mobile phones (read and reply to messages), and be willing to participate in the research by signing an informed consent form. Meanwhile, the exclusion criteria were pregnancy and hearing impairment. Some patients were categorized as lost to follow-up due to incomplete participation, withdrawal from the study, and death.

The control group underwent the usual care from the pharmacists at the community health center. Meanwhile, the treatment group received the modified brief counseling-5A and motivational reminder in the form of short messages. Before (pretest, first meeting) and after (posttest, second meeting) these treatments, the medication-taking behavior and compliance of the respondents were assessed.

2.3. Statistical analysis

The validity test used Pearson's correlation coefficient. Hence, the reliability (consistency) test was based on Cronbach's alpha. The Wilcoxon test was employed to identify the presence or absence of shifts in the stages of medication-taking behavior before and after the intervention (significant $p < 0.05$) as well as quantify the average scores of patient's medication-taking behavior and compliance.

3. RESULTS AND DISCUSSION

A total of 72 patients met the inclusion criteria and were randomly divided into two groups, namely control ($n=36$) and treatment ($n=36$). However, only 34 patients in the treatment group participated until the end of the research, whereas the other two were categorized into lost to follow-up as they were outside the study site.

The demographic characteristics of these respondents are presented in Table 1. The majority of the patients in the treatment group were ≤ 55 years old (61.1%), whereas those in the control group were mostly > 55 years old (69.4%). In both groups, women were dominant, i.e., 75% in the control group and 72.2% in the treatment group. Most respondents undertook ≤ 12 years of education, and a large proportion of them was unemployed. Almost all respondents had comorbidities but no family history of DM. In the treatment group, more than half of the patients had a history of DM for ≤ 5 years (58.3%). On the contrary, 52.8% of the respondents in the control group had to deal with DM for > 5 years. A higher number of patients in both groups practiced glucose/carbohydrate diet and had exercise habits.

Brief counseling by pharmacists was delivered depending on the assessment results of the respondents' condition, i.e., stages of behavior change. The average time of the brief counseling was 27.84 ± 6.78 minutes (mean \pm SD). Sending the SMS means supporting said counseling, which took place in categorically limited time. Also, the SMS contained motivational reminders that helped patients to remember taking their medicine while receiving encouragement to continue the treatment.

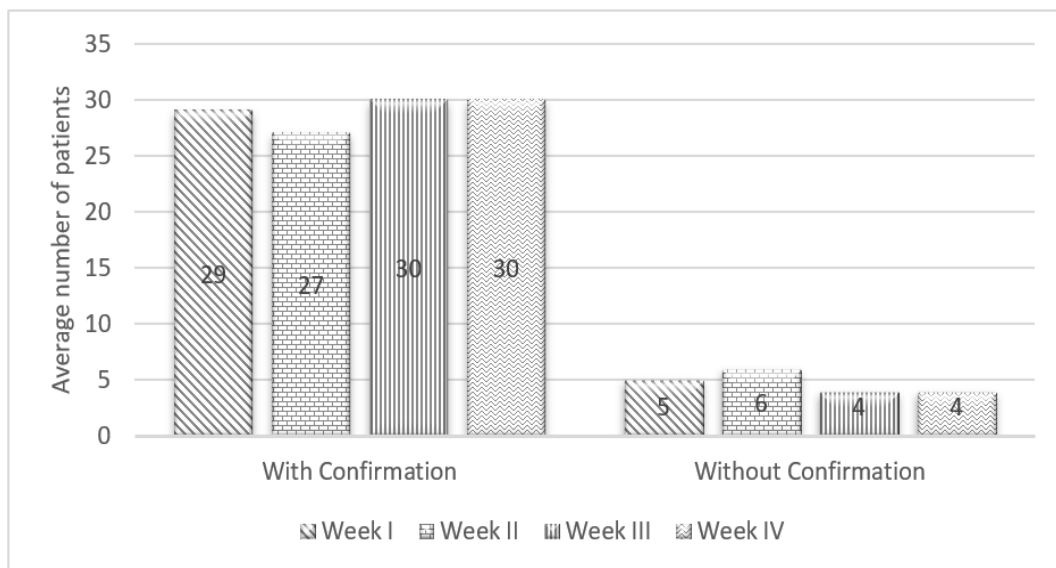
Short messages were sent for approximately 30 days, with the following details: sent daily for the first two weeks and, then, every three days in the next two weeks. A total of 18 patients received motivational text via WhatsApp messenger, while the other 16 patients via SMS. After receiving short messages, patients were encouraged to confirm. The average number of those who did is presented in Figure 1.

The above graph shows that most patients responded to motivational text reminders. In the second week, in which the short messages were sent daily, the number of received confirmations decreased from 29 to 27 patients. On the contrary, in the third and fourth weeks, this number did not experience any decrease. In other words, all patients in the third week continued to confirm that they had received the text reminders that were sent every three days until the last week. The time that they took to reply was around 20-120 minutes.

Based on Mann Whitney's analysis results, there was no statistically significant difference in the number of confirmations between the motivational text reminders sent every day and every three days ($p > 0.05$). It indicates that the total confirmation received in Week I-II and Week III-IV is categorically similar. Based on this, the level of patient response between giving motivational reminder messages both when giving motivational reminder messages every day, and every three days can be taken into consideration in the preparation of intervention media in future studies. It is still necessary to develop an intervention model such as an e-reminder application based on a mobile health application that can practically show the patient's response.

Table 1. The characteristics of diabetic patients in the control and treatment groups

No	Characteristics	Control group		Treatment group	
		Frequency	Percentage (%)	Frequency	Percentage (%)
	Total	36	100	36	100
1	Age				
	≤55 years old	11	30.6	22	61.1
	>55 years old	25	69.4	14	38.9
2	Gender				
	Male	9	25	10	27.8
	Female	27	75	26	72.2
3	Education				
	≤12 years	33	91.7	29	80.6
	>12 years	3	8.3	7	19.4
4	Occupation				
	Employed	14	38.9	17	47.2
	Unemployed	22	61.1	19	52.8
5	Comorbidity				
	Yes	27	75	23	63.9
	No	9	25	13	36.1
6	Family history of DM				
	Yes	16	44.4	18	50
	No	20	55.6	18	50
7	Duration of DM				
	≤5 years	17	47.2	21	58.3
	>5 years	19	52.8	15	41.7
8	Anti diabetic oral				
	Monotherapy	22	61.1	17	47.2
	Combination	14	38.9	19	52.8
9	Exercise				
	No	24	66.7	29	80.6
	Yes	12	33.3	7	19.4
10	Diet glucose/carbohydrat				
	No	3	8.3	10	27.8
	Yes	33	91.7	26	72.2
11	Body mass index				
	<25 kg/m ²	24	66.7	19	52.8
	≥25 kg/m ²	12	33.3	17	47.2
12	Medication-taking behavior	Mean±SD	8.78±2.29	8.12±1.98	
13	Compliance	Mean±SD	22.17±2.76	20.83±3.3	
14	Fasting blood sugar level	Mean±SD (mg/dL)	192.84±75	188.41±65.57	



Notes: a) Week I: the short messages were sent daily, b) Week II: the short messages were sent daily, c) Week III: the short messages were sent every three days, d) Week IV: the short messages were sent every three days, e) Total: 34 patients

Figure 1. The number of diabetic patients who confirmed after receiving motivational reminders from May to August, 2018

One of the processes in brief counseling-5A is assessment, which involves assessing the condition of patients to determine their level of readiness to behavior change. Brief counseling by pharmacists was delivered based on the stage of transformations in medication-taking behavior. ACPM (2009) proposes four steps of behavior change, namely pre-contemplation, contemplation, preparation, and action. After brief counseling by pharmacists, the target patients were expected to show a step-up to the next stage, as well as a higher score of medication-taking behavior [17]. The steps of behavior change of the control and treatment groups are summarized in Table 2.

Table 2. The stages of behavior change of diabetic patients belonging to the control and treatment groups as observed in the first (pretest) and second (posttest) meeting

Stage of behavior change	Pretest		Post test		p-value
	N	%	N	%	
Control group					
Pre-contemplation	30	83.3	29	80.6	0.773
Contemplation	1	2.8	3	8.3	
Preparation	4	11.1	4	11.1	
Action	1	2.8	0	0	
Intervention group					
Pre-contemplation	32	88.9	10	27.8	0.000**
Contemplation	3	8.3	0	0	
Preparation	1	2.8	13	36.1	
Action	0	0	11	30.6	

The Wilcoxon test; a decrease in behavior change in 4 respondents, a constant stage in 28 respondents, and an increase in 4 respondents. p-value: the significance between the pretest-posttest results of each group; (**) marks a significant difference

The Wilcoxon test revealed that the stages of change in medication-taking behavior varied among the patients in the control group. As many as four respondents showed a decrease, 28 patients did not experience any changes in their behavior, and another four respondents exhibited an increase. Based on the test results, there were no significant shifts (neither increase nor decrease) in the stage of behavior change in this group ($p > 0.05$). This finding is in line with Muslimin [12]. Combining brief counseling by pharmacists with motivational text reminders theoretically encourages improvement in patient's medication-taking behavior. The different behaviors that the patients exhibited in the first and second visits are presented in Table 3.

Table 3. The score of medication-taking behavior of diabetic patients as observed in the first (pretest) and second (posttest) meeting

Groups	Pretest	Posttest	Δ mean of posttest-pretest	p-value
Control	8.78 \pm 2.29	8.81 \pm 2.03	0.02 \pm 1.66	0.744
Treatment	8.11 \pm 1.94	10.88 \pm 1.22	2.76 \pm 1.59	0.000**

The Wilcoxon test results, the data are presented in mean \pm SD

p-value: the significance between the pretest-posttest results of each group; (**) marks a significant difference

The Wilcoxon test of the control group proved that the scores of medication-taking behaviors measured in the pretest and posttest were insignificantly different ($p > 0.05$). Accordingly, the patients included in this group exhibited no behavior improvement. On the contrary, the treatment group showed a significant increase in behavior between the pretest and the posttest ($p < 0.05$). This outcome is potentially caused by brief counseling-5A that has led to an increase in knowledge or understanding of proper treatment. Notoatmodjo [18] believes that, theoretically, behavior change through the process of knowledge transformation is followed by attitudes and, then, behavior change. Moreover, Swaroop *et al.* have reported that counseling by pharmacists can improve patients' knowledge about the disease and its treatment and, consequently, affect the attitudes, as well as practices, of said patients toward the disease [8].

As a conclusion, the medication-taking behavior score of patients significantly increases after receiving modified brief counseling-5A and motivational text reminders. In other terms, these interventions positively affect diabetes treatment. An increase in medication-taking behavior can shape overall patient compliance with treatment. The patient compliance, as measured with the MARS questionnaire, is presented in Table 4 [9].

Table 4. The scores of compliances with drug administration procedure among DM patients as measured using the MARS questionnaire in the first (pretest) and second (posttest) visits

Groups	Pretest	Posttest	Δ mean of posttest-pretest	p-value
Control	22.17 \pm 2.76	22.86 \pm 2.60	0.69 \pm 2.09	0.744
Treatment	20.83 \pm 3.31	24.18 \pm 1.73	3.44 \pm 3.45	0.000**

The Wilcoxon test results, the data are presented in mean \pm SD

p-value: the significance between the pretest-posttest results of each group; (**) marks a significant difference

The Wilcoxon test results proved that the compliance scores between the first and second visits were insignificantly different ($p > 0.05$). It indicates the absence of an increase in patient adherence. Conversely, in the treatment group, the pretest and posttest scores were significantly different ($p < 0.05$), meaning that the patient adherence to medication improves.

These results correspond with several previous studies. For instance, providing brief counseling and motivational text reminders to patients with chronic diseases has been reported to positively improve adherence to medication [12], [19]. Also, brief counseling by pharmacists has been confirmed as an effective method of increasing patient compliance. Furthermore, sending motivational text reminders can raise patients' awareness and, by proxy, adherence [19].

With the pill count, the percentage of compliance was obtained as shown in Table 5. Pill count was conducted after the intervention was completed (i.e., posttest). This technique measures patient compliance with medication and offers an objective result as a part of its advantages. Based on the pill count, there were differences in patient compliance with medication. Patients possibly still had several anti-diabetic drugs from the previous month (before the research), which then affected the compliance score measured in the following month (during the research). Meanwhile, based on the MARS questionnaire, patients showed improved compliance with medication after receiving brief counseling by pharmacists and motivational text reminders. This finding confirms that pharmacists play a crucial role in the treatment of diabetic patients.

Table 5. The compliance (%) of DM patients with medication based on pill count in the first (pretest) and second (posttest) visits

	Control group	Treatment group	p-value
Mean percentage of patient compliance with medication	69.64±27.66	83.63±16.59	0.096

The Wilcoxon test results, the data are presented in mean±SD

p-value: the significance between the mean percentages of patient compliance in the two groups

This study reveals that the provision of brief pharmacist counseling accompanied by a motivational reminder message can contribute to the treatment of diabetes mellitus patients. Motivational text reminder messages sent via WhatsApp (WA) or SMS can improve treatment behavior and medication adherence in the treatment group ($p < 0.05$). However, the results of the matching between the level of adherence based on the MARS questionnaire with the physical amount of the drug (pill count) are still a limitation in this study, indicated by the p-value > 0.05 .

The role of pharmacist education based on text messages using either the WA or SMS platform shows one of the educational models that is quite affordable in terms of cost and give the impact on adherence level [20], [21]. This is in line with Haider research [22]. It showed that text message-based education is effective in improving DM management, both lifestyle management and medication adherence. In the other hands, pharmacist counselling also improve controlling blood sugar level and increase the quality of life of diabetic patients [10]. Further research is needed regarding the development of pharmacist intervention models related to educational media and digital literacy-based medication reminder messages. Opportunities in using smartphone apps-based e-health showed that they are quite effective in managing DM patients, especially increasing compliance [23], [24].

Education related to lifestyle, both medication adherence, diet management, is needed in the management of diabetes mellitus [25]. Several factors such as low adherence, inadequate support and motivation in the disease management, can contribute to uncontrolled blood glucose levels of patients [26]. The intervention in the form of technology-based education is considered to be able to improve diabetes therapy management. One of them is m-health education based on text messages. The provision of a text message-based reminder intervention showed that it was able to increase the adherence of DM patients, this is in line with the research of Arao *et al.* [26], [27].

The other factors that influence medication adherence are perception of illness, health literacy, self-efficacy and psychosocial factors, both personal and cultural beliefs. This is associated with the aspect of religiosity [28]. In this study, a motivational message was given which included a religious message. Lifestyle settings in the form of diet in the management of diabetes mellitus are associated with religious, family, psychosocial, financial and personal factors. The ADA states that the dietary management of DM patients also takes into account the culture of the population and religion. Although in the study of Katsaridis Savvas *et al.* it showed that Muslims and Christians did not show significant differences regarding adherence to dietary behavior management [25]. Research related to religious coping conducted by Maguna Made *et al.* showed that there was a significant relationship between religious coping and medication adherence also quality of life [29]. Based on this data that religious motivational messages can contribute to medication adherence and management of the lifestyle or behavior of DM patients.

The provision of repeated interventions such as reminder messages and educational messages was shown to be more effective in increasing compliance and changing behavior. Li [30] showed that patient compliance was higher in the group that was given the SMS reminder intervention five times per week than three times per week. In addition, patient-centered care (PCC) recommend several things to improve patient

therapy adherence, including increasing understanding of health literacy, simplifying therapy (avoiding polypharmacy), communication and motivation from health workers, increasing social support, and maximizing the use of technology in educational interventions and reminders [31].

4. CONCLUSION

The combination of modified brief counseling-5A by pharmacists and motivational text reminders containing religious aspect triggers a positive transformation (Δ) in the stage of behavior change (by 2.76 ± 1.59) and compliance of DM patients with medication (by 3.44 ± 3.45). For this reason, such combination plays a positive role in diabetes therapy management. The study suggests that patient counselling using religious and motivational aspect provided by pharmacists may help improve patient's management about the disease and influences the patient's medication adherence and improving glycemic control and prevention of further complications of the disease.

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REFERENCES

- [1] K. Ogurtsova *et al.*, "IDF Diabetes Atlas: Global estimates for the prevalence of diabetes for 2015 and 2040," *Diabetes Research and Clinical Practice*, vol. 128, pp. 40–50, 2017, doi: 10.1016/j.diabres.2017.03.024.
- [2] J. Oliver, *Guidelines for the Prevention, Management and Care of Diabetes Mellitus*, vol. 53, no. 9, 2013.
- [3] Indonesian Ministry of Health, "Pharmaceutical care for diabetes mellitus (In Indonesia: *Pharmaceutical care untuk penyakit diabetes mellitus*)," *Departemen Kesehatan RI*, pp. 1–89, 2005.
- [4] American Diabetes Association, "Standard medical care in diabetes 2018," *The journal of clinical and applied research and education*, vol. 41, no. January, 2018, doi: 10.2337/dc18-Sint01.
- [5] E. P. Chow, M. A. Hassali, F. Saleem, and H. Aljadhey, "Effects of pharmacist-led patient education on diabetes-related knowledge and medication adherence: A home-based study," *Health Education Journal*, vol. 75, no. 4, pp. 421–433, 2016, doi: 10.1177/0017896915597021.
- [6] N. R. Al Mazroui, M. M. Kamal, N. M. Ghabash, T. A. Yacout, P. L. Kole, and J. C. McElnay, "Influence of pharmaceutical care on health outcomes in patients with Type 2 diabetes mellitus," *British Journal of Clinical Pharmacology*, vol. 67, no. 5, pp. 547–557, 2009, doi: 10.1111/j.1365-2125.2009.03391.x.
- [7] J. Shareef and J. Fernandes, "Evaluating the effect of pharmacist's delivered counseling on medication adherence and glycemic control in patients with diabetes mellitus," *Journal of Diabetes & Metabolism*, vol. 07, no. 03, 2016, doi: 10.4172/2155-6156.1000654.
- [8] A. Mary Swaroop, C. Varghese, J. Jose, and P. Kalra, "Impact of patient counselling on knowledge, attitude, practice and medication adherence in type 2 diabetes mellitus patients," *European Journal of Pharmaceutical and Medical Research*, vol. 3, no. 4, pp. 231–235, 2016.
- [9] G. Z. Saputri, A. Akrom, M. Muhlis, and A. Muthoharoh, "(In Indonesia: *Efek konseling menggunakan brief counseling 5a modifikasi disertai pesan motivasi farmasi dalam peningkatan perilaku dan outcome klinik pasien diabetes melitus dengan hipertensi rawat jalan di Rsud Panembahan Senapati, Bantul*)," *Indonesian Journal of Clinical Pharmacy*, vol. 8, no. 1, 2019, doi: 10.15416/ijcp.2019.8.1.31.
- [10] O. M. Sari, G. Z. Saputri, and Akrom, "Diabetes mellitus patients' fasting blood sugar levels and quality of life following brief pharmacist counseling with reminders and motivational messages," *International Journal of Basic & Clinical Pharmacology*, vol. 11, no. 1, p. 13, 2021, doi: 10.18203/2319-2003.ijbcp20214885.
- [11] P. E. Trivana, "the effect of brief counseling on behavior level, adherence adherence, therapeutic outcomes and quality of life of diabetes mellitus patients with hypertension in the outpatient polyclinic of the Jember Plantation Hospital Clinic (In Indonesia: *Pengaruh b*)," *Repository.Unej.Ac.Id*, 2019.
- [12] M. A. Muslimin, A. A. P. Setiadi, and Y. I. Wibowo, "Effect of brief counseling 5A modification on compliance and blood sugar levels of patients with type 2 diabetes mellitus at Sawerigading Hospital, Palopo City (In Indonesia: *Pengaruh Brief counseling modifikasi 5A terhadap kepatuhan dan kadar gula darah, Palopo City*)" *Jurnal Pharmascience*, vol. 8, no. 2, p. 149, 2021, doi: 10.20527/jps.v8i2.11355.
- [13] J. Thakkar *et al.*, "Mobile telephone text messaging for medication adherence in chronic disease a meta-analysis," *JAMA Internal Medicine*, vol. 176, no. 3, pp. 340–349, 2016, doi: 10.1001/jamainternmed.2015.7667.
- [14] P. Darvyri, S. Christodoulakis, M. Galanakis, A. G. Avgoustidis, A. Thanopoulou, and G. P. Chrousos, "On the role of spirituality and religiosity in type 2 diabetes mellitus management—a systematic review," *Psychology*, vol. 09, no. 04, pp. 728–744, 2018, doi: 10.4236/psych.2018.94046.
- [15] A. M. P. Alfian, R., Putra, "Test the validity and reliability of the medication adherence report scale (MARS) questionnaire for patients with diabetes mellitus (In Indonesia: Uji validitas dan reliabilitas kuesioner medication adherence report scale (MARS) terhadap pasien diabetes mellitus)," *Jurnal Ilmiah Ibnu Sina*, vol. 2, no. 2, pp. 176–183, 2017.
- [16] W. Adikusuma and N. Qiyaam, "Adherence level and blood sugar control of type 2 diabetes mellitus patients who gets counseling and short messages service as reminder and motivation," *Asian Journal of Pharmaceutical and Clinical Research*, vol. 11, no. 2, pp. 219–222, 2018, doi: 10.22159/ajpcr.2018.v11i2.22988.
- [17] ACPM, "Coaching and counseling patients a resource from the american college of preventive medicine a clinical reference," *American College of Preventive Medicine*, pp. 1–56, 2009.
- [18] S. Notoatmodjo, *Health promotion and behavioral science (In Indonesia: Promosi kesehatan dan ilmu perilaku)*. Jakarta: Rineka Cipta, 2014.




- [19] Akrom and A. Nurwijayanti, "Brief counseling and mobile phone short message service (SMS) increase patient compliance," *International Journal of Pharma Medicine and Biological Sciences*, vol. 4, no. 3, pp. 175–179, 2015, doi: 10.18178/ijpmb.4.3.175-179.
- [20] Y. Suffiana, F. Rahmawati, and T. M. Andayani, "The effect of medication reminder chart on level of adherence in diabetes mellitus type 2 patients at rsud Sleman Yogyakarta," *Indonesian Journal of Pharmacy*, vol. 28, no. 2, pp. 125–130, 2017, doi: 10.14499/indonesianjpharm28iss2pp125.
- [21] M. I. N. A. Wibowo, D. Setiawan, N. D. Ikhwanati, and F. A. Sukma, "The effect of counseling and medication reminder aids on medication adherence and clinical outcomes of patients with diabetes mellitus and hypertension (In Indonesia: Pengaruh konseling dan alat bantu pengingat pengobatan terhadap kepatuhan minum obat dan outcome klinik pasien diabetes melitus dan hipertensi)," *Jurnal Ilmu Kefarmasian Indonesia*, vol. 18, no. 2, pp. 169–176, 2020.
- [22] R. Haider, L. Sudini, C. K. Chow, and N. W. Cheung, "Mobile phone text messaging in improving glycaemic control for patients with type 2 diabetes mellitus: A systematic review and meta-analysis," *Diabetes Research and Clinical Practice*, vol. 150, no. August 2018, pp. 27–37, 2019, doi: 10.1016/j.diabres.2019.02.022.
- [23] Z. Huang, E. Lum, G. Jimenez, M. Semwal, P. Sloom, and J. Car, "Medication management support in diabetes: A systematic assessment of diabetes self-management apps," *BMC Medicine*, vol. 17, no. 1, pp. 1–12, 2019, doi: 10.1186/s12916-019-1362-1.
- [24] F. Yasmin *et al.*, "The influence of mobile phone-based health reminders on patient adherence to medications and healthy lifestyle recommendations for effective management of diabetes type 2: A randomized control trial in Dhaka, Bangladesh," *BMC Health Services Research*, vol. 20, no. 1, pp. 1–12, 2020, doi: 10.1186/s12913-020-05387-z.
- [25] S. Katsaridis *et al.*, "Low reported adherence to the 2019 american diabetes association nutrition recommendations among patients with type 2 diabetes mellitus, indicating the need for improved nutrition education and diet care," *Nutrients*, vol. 12, no. 11, pp. 1–17, 2020, doi: 10.3390/nu12113516.
- [26] S. Ashrafzadeh and O. Hamdy, "Patient-driven diabetes care of the future in the technology era," *Cell Metabolism*, vol. 29, no. 3, pp. 564–575, 2019, doi: 10.1016/j.cmet.2018.09.005.
- [27] R. K. Arao *et al.*, "Strengthening value-based medication management in a free clinic for the uninsured: Quality interventions aimed at reducing costs and enhancing adherence," *BMJ Open Quality*, vol. 6, no. 2, p. e000069, 2017, doi: 10.1136/bmjopen-2017-000069.
- [28] W. Shahin, G. A. Kennedy, and I. Stupans, "The impact of personal and cultural beliefs on medication adherence of patients with chronic illnesses: A systematic review," *Patient Preference and Adherence*, vol. 13, pp. 1019–1035, 2019, doi: 10.2147/PPA.S212046.
- [29] M. M. Putra, K. S. Mariani, and N. N. A. Ratnadi, "Religious coping, medication adherence and quality of life for diabetes mellitus patients," *Indonesian Journal of Community Health Nursing*, vol. 6, no. 1, p. 18, 2021, doi: 10.20473/ijchn.v6i1.26663.
- [30] A. Li, M. Cunich, N. Fuller, K. Purcell, A. Flynn, and I. Caterson, "Improving adherence to weight-loss medication (liraglutide 3.0 mg) using mobile phone text messaging and healthcare professional support," *Obesity*, vol. 28, no. 10, pp. 1889–1901, 2020, doi: 10.1002/oby.22930.
- [31] L. R. Martin, C. Feig, C. R. Maksoudian, K. Wysong, and K. Faasse, "A perspective on nonadherence to drug therapy: Psychological barriers and strategies to overcome nonadherence," *Patient Preference and Adherence*, vol. 12, pp. 1527–1535, 2018, doi: 10.2147/PPA.S155971.

BIOGRAPHIES OF AUTHORS






Ginanjar Zukhruf Saputri    is a lecturer on Pharmacy Faculty of Universitas Ahmad Dahlan, Indonesia. She has interest research topics about clinical pharmacy, social and community pharmacy, especially about development of pharmaceutical care intervention such us counseling method using Brief Conseling 5A, and improving adherence of medication using reminder and motivational messages in hypertension and Diabetes Mellitus patients. She can be contacted at email: zukhruf.alparslan@gmail.com.



Okta Muthia Sari    is a lecturer in Pharmacy Study Program of Faculty of Mathematics and Natural Sciences, Lambung Mangkurat University, Banjarbaru, Indonesia. She has interest topics about social and community pharmacy, also clinical pharmacy. Her research about development of counseling method, adherence of medication and quality of life of hypertension and diabetes mellitus patient. She can be contacted at email: muthiaoktasari@gmail.com.



Akrom Akrom    is a lecturer in Pharmacology and Clinical Pharmacy on Faculty Pharmacy, Universitas Ahmad Dahlan, Indonesia. His interest research topics are about imunopharmacology, pharmacoepidemiology biomelecular, and about evidence based medicine. He also focused on pytomedicine immunopharmacology, chemopreventive immunopharmacology, health technology asesment and medication error in the hospital and primary health care, the development of pharmaceutical care intervention method for chronic disease (asthma, hypertension, diabetes, COPD, and HIV-AIDS), and about survey on smoking as a risk factor for chronic diseases. He can be contacted at email: akrom@pharm.uad.ac.id.

Modified brief counseling-5A, motivational SMS on medication-taking behavior and compliance among diabetic patients

Ginanjar Zukhruf Saputri¹, Okta Muthia Sari², Akrom Akrom¹

¹Department of Clinical Pharmacy, Faculty of Pharmacy, Universitas Ahmad Dahlan, Yogyakarta, Indonesia

²Department of Clinical Pharmacy; Faculty of Math and Science, University of Lambung Mangkurat, Kalimantan, Indonesia

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ABSTRACT

Knowledge of diabetes mellitus (DM) management can improve adherence in medication-taking behavior. Counseling by pharmacists is believed to contribute to its better acquisition. Nevertheless, many counseling and reminder media are still currently developed. This study aimed to identify the effects of brief counseling-5A modification and a motivational reminder through short message services (SMS), designed with a religious approach, on medication-taking behavior and adherence among DM outpatients at Jety 1 Community Health Center, Bantul, Yogyakarta, Indonesia. This quasi-experimental study employed a pretest-posttest control group design. Data were collected prospectively from May to August, 2018. There were 72 patients who met the inclusion criteria divided evenly into two groups, the treatment group and the control group. The data collected by interviews using questionnaires on medication-taking behavior and the medication adherence rating scale (MARS) and were statistically assessed using the Wilcoxon test. The results showed that brief counseling-5A, combined with religious motivational SMS, raised the stage of behavior change in DM patients. There were increases (Δ) in medication-taking behavior by 2.76 ± 1.59 and patient compliance by 3.44 ± 3.45 . In conclusion, brief counseling-5A by pharmacists and motivational text reminders can improve the medication-taking behavior and compliance of DM patients with the therapy.

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Corresponding Author:

Ginanjar Zukhruf Saputri

Department of Clinical Pharmacy, Faculty of Pharmacy, Universitas Ahmad Dahlan

Jl. Prof. DR. Soepomo Sh, Warungboto, Umbulharjo, Yogyakarta, Indonesia

Email: zukhruf.alparslan@gmail.com

1. INTRODUCTION

The International Diabetes Federation (IDF) states that, in 2015, up to 415 million people from the age range of 20-79 years suffered from diabetes mellitus (DM), and 10 million of them were Indonesian [1]. DM management comprises lifestyle modification, regular drug administration, and routine doctor visits as part of health control [2]. The ultimate purpose is to control blood glucose levels and improve the quality of life of DM patients [3], [4]. However, blood sugar control may not be optimal because of several factors, including inadequate knowledge and low medication adherence [5].

Previous studies have shown that counseling by pharmacists significantly shapes the outcome of the treatment of diabetes mellitus patients [5]–[8]. Previous study claims that brief counseling by pharmacists can help to improve medication-taking behavior, and adherence to medication. It also improve the quality of life among DM-hypertensive patients [9]–[12].

Thakkar *et al.* suggest that in addition to counseling, sending short messages to patients with chronic diseases can raise their compliance from 50 to 67.8% (17.8% increase). Also, the other advantages are that short message services (SMS) is easy to use and can deliver information immediately with unlimited coverage [13]. Brief counseling-5A is a modified model of brief counseling by pharmacists. Combined with a text reminder to hypertensive patients, it has been reported to exhibit a positive outcome, that is, improved quality of life [9], [10]. A further investigation in Saputri *et al.* reveals that the levels of behavior of the treatment group 1 (brief counseling-5A) and treatment group 2 (brief counseling-5A+motivational short message services (SMS)) have more significant proportions (21.2% each) than that of the control group (12.1%) [9]. For the reasons above, brief counseling by pharmacists and motivational reminder via SMS positively contribute to the successful treatment of hypertensive diabetic inpatients. Nevertheless, there is still a lack of research on both types of intervention at community health centers.

In Indonesia, primary medical care serves as the first destination of referral for, among others, DM patients and is offered in level-1 facilities, such as community health centers. According to the Health Profile of Bantul Regency, diabetes is included in the top 10 diseases at the community health centers and the number of visits has increased compared to the previous year [3]. Jetis 1, Bantul community health center showed the higher visit rates for diabetic patients. The high number of patient visits causes time constraints in the interaction between patients and the pharmacy. Based on the American Diabetes Association (ADA) [4], diabetic patients are patients who need to be counseled by pharmacists regarding their treatment. Brief counseling is recommended in implementing health behavior change counseling in primary health facilities such as community health centers. Therefore, a study of brief counseling by pharmacists, together with motivational reminders via text messages, for DM outpatients at community health centers becomes necessary. This study develops the brief counseling-5A model and combines it with motivational SMS. Aside from diabetes mellitus and its treatment, counseling incorporates religious aspects. Through a systematic review, Darvyri *et al.* propose that religion or religiosity contributes to the efficacy of type-2 diabetes treatment as it helps in achieving better blood glucose control [14].

2. RESEARCH METHOD

This study has been approved by the Ethics Committee of Ahmad Dahlan University (KEP UAD) with EC No. 011802025. It employed a quasi-experimental technique, particularly randomized pretest-posttest design with control and treatment groups. The control group underwent the usual care, while the treatment group received brief counseling-5A and motivational SMS. The data were collected prospectively and by filling out the questionnaires and health assessment sheets.

2.1. Instruments

The content of the brief counseling-5A model was redeveloped for DM patients and to incorporate a religious approach. It refers to a previous study on brief counseling-5A for Patients with DM-Hypertension [9]. The modified brief counseling-5A was a pharmaceutical intervention that was delivered in a focus group discussion (FGD). In this study, the questionnaire on medication-taking behavior was developed from a previous study, i.e., Saputri *et al.* by adjusting the content to the research subject, namely DM patients. The next step was validity testing by experts like doctors, pharmacists, and clinical psychologists [9].

The questionnaire on medication-taking behavior measures the cognitive, affective, and psychomotor domains of patients in the treatment. Correct answers were scored with +1, whereas the wrong ones were assigned with 0. As for questionnaire item No. 12, score 0 meant "yes", while 1 represented "no, never". The measurement results were then categorized into several stages of change in medication-taking behavior, namely pre-contemplation, contemplation, preparation, and action.

The validity and reliability tests of the first questionnaire, i.e., medication-taking behavior, involved 41 patients who had met the inclusion criteria. The former produced r count > 0.308 for each question, while the latter yielded Cronbach's alpha of 0.738. Meanwhile, the second questionnaire that measured patient compliance adopted the medication adherence rating scale (MARS). Involving 25 in-patients with diabetes mellitus, Alfian and Putra analyze the validity and reliability of the MARS questionnaire and produce r count ranging from 0.682 to 0.829 ($r > 0.396$) and Cronbach's alpha of 0.803 (≥ 0.70). In other terms, the two sets of questionnaires are valid and reliable for the measurement of medication-taking behavior and compliance among DM patients [15].

The reminder was a modified short message from the one used in Saputri *et al.* and Adikusuma, with the addition of religious content [9], [16]. The researchers sent it by SMS or WhatsApp messenger (WA) for one month (30 days) every morning or evening to remind patients to take their medication on time. Modification on the content of the motivational text was reviewed by doctors, pharmacists, and clinical psychologists.

2.2. Subjects

The research subjects who had fulfilled the inclusion criteria were evenly divided into two groups, namely the control group (receiving the usual care from the pharmacists at the community health center) and the treatment group (receiving brief counseling-5A and motivational SMS from the researchers). The inclusion criteria were outpatients at Jetis 1 community health center aged 18 years old and diagnosed with type 2 DM with or without comorbidities during the research period. Also, they had to receive at least one oral anti-diabetic drug in the past three months, have and be able to use mobile phones (read and reply to messages), and be willing to participate in the research by signing an informed consent form. Meanwhile, the exclusion criteria were pregnancy and hearing impairment. Some patients were categorized as lost to follow-up due to incomplete participation, withdrawal from the study, and death.

The control group underwent the usual care from the pharmacists at the community health center. Meanwhile, the treatment group received the modified brief counseling-5A and motivational reminder in the form of short messages. Before (pretest, first meeting) and after (posttest, second meeting) these treatments, the medication-taking behavior and compliance of the respondents were assessed.

2.3. Statistical analysis

The validity test used Pearson's correlation coefficient. Hence, the reliability (consistency) test was based on Cronbach's alpha. The Wilcoxon test was employed to identify the presence or absence of shifts in the stages of medication-taking behavior before and after the intervention (significant $p < 0.05$) as well as quantify the average scores of patient's medication-taking behavior and compliance.

3. RESULTS AND DISCUSSION

A total of 72 patients met the inclusion criteria and were randomly divided into two groups, namely control ($n=36$) and treatment ($n=36$). However, only 34 patients in the treatment group participated until the end of the research, whereas the other two were categorized into lost to follow-up as they were outside the study site.

The demographic characteristics of these respondents are presented in Table 1. The majority of the patients in the treatment group were ≤ 55 years old (61.1%), whereas those in the control group were mostly > 55 years old (69.4%). In both groups, women were dominant, i.e., 75% in the control group and 72.2% in the treatment group. Most respondents undertook ≤ 12 years of education, and a large proportion of them was unemployed. Almost all respondents had comorbidities but no family history of DM. In the treatment group, more than half of the patients had a history of DM for ≤ 5 years (58.3%). On the contrary, 52.8% of the respondents in the control group had to deal with DM for > 5 years. A higher number of patients in both groups practiced glucose/carbohydrate diet and had exercise habits.

Brief counseling by pharmacists was delivered depending on the assessment results of the respondents' condition, i.e., stages of behavior change. The average time of the brief counseling was 27.84 ± 6.78 minutes (mean \pm SD). Sending the SMS means supporting said counseling, which took place in categorically limited time. Also, the SMS contained motivational reminders that helped patients to remember taking their medicine while receiving encouragement to continue the treatment.

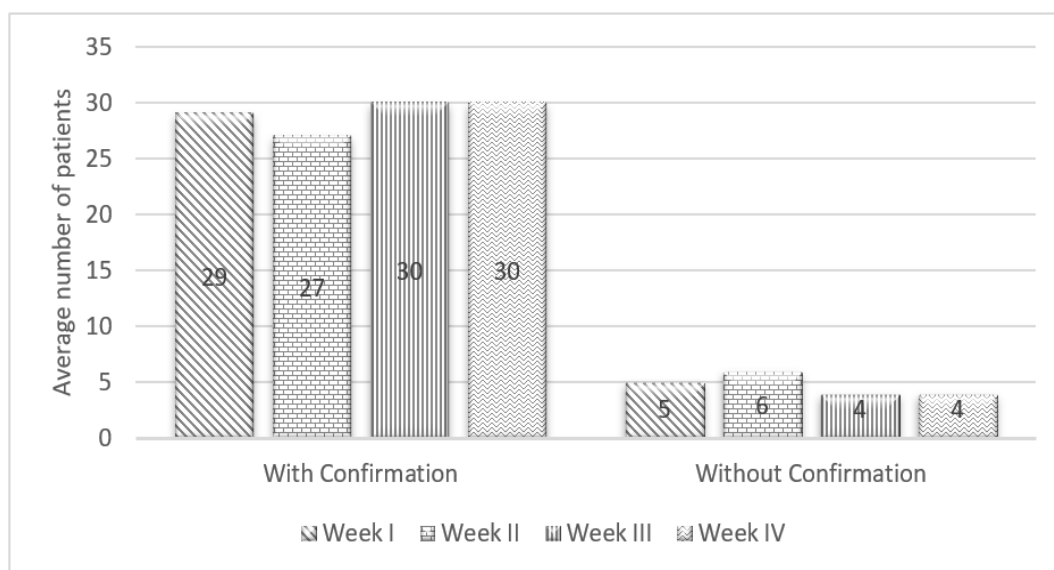
Short messages were sent for approximately 30 days, with the following details: sent daily for the first two weeks and, then, every three days in the next two weeks. A total of 18 patients received motivational text via WhatsApp messenger, while the other 16 patients via SMS. After receiving short messages, patients were encouraged to confirm. The average number of those who did is presented in Figure 1.

The above graph shows that most patients responded to motivational text reminders. In the second week, in which the short messages were sent daily, the number of received confirmations decreased from 29 to 27 patients. On the contrary, in the third and fourth weeks, this number did not experience any decrease. In other words, all patients in the third week continued to confirm that they had received the text reminders that were sent every three days until the last week. The time that they took to reply was around 20-120 minutes.

Based on Mann Whitney's analysis results, there was no statistically significant difference in the number of confirmations between the motivational text reminders sent every day and every three days ($p > 0.05$). It indicates that the total confirmation received in Week I-II and Week III-IV is categorically similar. Based on this, the level of patient response between giving motivational reminder messages both when giving motivational reminder messages every day, and every three days can be taken into consideration in the preparation of intervention media in future studies. It is still necessary to develop an intervention model such as an e-reminder application based on a mobile health application that can practically show the patient's response.

Table 1. The characteristics of diabetic patients in the control and treatment groups

No	Characteristics	Control group		Treatment group	
		Frequency	Percentage (%)	Frequency	Percentage (%)
	Total	36	100	36	100
1	Age				
	≤55 years old	11	30.6	22	61.1
	>55 years old	25	69.4	14	38.9
2	Gender				
	Male	9	25	10	27.8
	Female	27	75	26	72.2
3	Education				
	≤12 years	33	91.7	29	80.6
	>12 years	3	8.3	7	19.4
4	Occupation				
	Employed	14	38.9	17	47.2
	Unemployed	22	61.1	19	52.8
5	Comorbidity				
	Yes	27	75	23	63.9
	No	9	25	13	36.1
6	Family history of DM				
	Yes	16	44.4	18	50
	No	20	55.6	18	50
7	Duration of DM				
	≤5 years	17	47.2	21	58.3
	>5 years	19	52.8	15	41.7
8	Anti diabetic oral				
	Monotherapy	22	61.1	17	47.2
	Combination	14	38.9	19	52.8
9	Exercise				
	No	24	66.7	29	80.6
	Yes	12	33.3	7	19.4
10	Diet glucose/carbohydrat				
	No	3	8.3	10	27.8
	Yes	33	91.7	26	72.2
11	Body mass index				
	<25 kg/m ²	24	66.7	19	52.8
	≥25 kg/m ²	12	33.3	17	47.2
12	Medication-taking behavior	Mean±SD	8.78±2.29	8.12±1.98	
13	Compliance	Mean±SD	22.17±2.76	20.83±3.3	
14	Fasting blood sugar level	Mean±SD (mg/dL)	192.84±75	188.41±65.57	



Notes: a) Week I: the short messages were sent daily, b) Week II: the short messages were sent daily, c) Week III: the short messages were sent every three days, d) Week IV: the short messages were sent every three days, e) Total: 34 patients

Figure 1. The number of diabetic patients who confirmed after receiving motivational reminders from May to August, 2018

One of the processes in brief counseling-5A is assessment, which involves assessing the condition of patients to determine their level of readiness to behavior change. Brief counseling by pharmacists was delivered based on the stage of transformations in medication-taking behavior. ACPM (2009) proposes four steps of behavior change, namely pre-contemplation, contemplation, preparation, and action. After brief counseling by pharmacists, the target patients were expected to show a step-up to the next stage, as well as a higher score of medication-taking behavior [17]. The steps of behavior change of the control and treatment groups are summarized in Table 2.

Table 2. The stages of behavior change of diabetic patients belonging to the control and treatment groups as observed in the first (pretest) and second (posttest) meeting

Stage of behavior change	Pretest		Post test		p-value
	N	%	N	%	
Control group					
Pre-contemplation	30	83.3	29	80.6	0.773
Contemplation	1	2.8	3	8.3	
Preparation	4	11.1	4	11.1	
Action	1	2.8	0	0	
Intervention group					
Pre-contemplation	32	88.9	10	27.8	0.000**
Contemplation	3	8.3	0	0	
Preparation	1	2.8	13	36.1	
Action	0	0	11	30.6	

The Wilcoxon test; a decrease in behavior change in 4 respondents, a constant stage in 28 respondents, and an increase in 4 respondents. p-value: the significance between the pretest-posttest results of each group; (**) marks a significant difference

The Wilcoxon test revealed that the stages of change in medication-taking behavior varied among the patients in the control group. As many as four respondents showed a decrease, 28 patients did not experience any changes in their behavior, and another four respondents exhibited an increase. Based on the test results, there were no significant shifts (neither increase nor decrease) in the stage of behavior change in this group ($p > 0.05$). This finding is in line with Muslimin [12]. Combining brief counseling by pharmacists with motivational text reminders theoretically encourages improvement in patient's medication-taking behavior. The different behaviors that the patients exhibited in the first and second visits are presented in Table 3.

Table 3. The score of medication-taking behavior of diabetic patients as observed in the first (pretest) and second (posttest) meeting

Groups	Pretest	Posttest	Δ mean of posttest-pretest	p-value
Control	8.78 \pm 2.29	8.81 \pm 2.03	0.02 \pm 1.66	0.744
Treatment	8.11 \pm 1.94	10.88 \pm 1.22	2.76 \pm 1.59	0.000**

The Wilcoxon test results, the data are presented in mean \pm SD p-value: the significance between the pretest-posttest results of each group; (**) marks a significant difference

The Wilcoxon test of the control group proved that the scores of medication-taking behaviors measured in the pretest and posttest were insignificantly different ($p > 0.05$). Accordingly, the patients included in this group exhibited no behavior improvement. On the contrary, the treatment group showed a significant increase in behavior between the pretest and the posttest ($p < 0.05$). This outcome is potentially caused by brief counseling-5A that has led to an increase in knowledge or understanding of proper treatment. Notoatmodjo [18] believes that, theoretically, behavior change through the process of knowledge transformation is followed by attitudes and, then, behavior change. Moreover, Swaroop *et al.* have reported that counseling by pharmacists can improve patients' knowledge about the disease and its treatment and, consequently, affect the attitudes, as well as practices, of said patients toward the disease [8].

As a conclusion, the medication-taking behavior score of patients significantly increases after receiving modified brief counseling-5A and motivational text reminders. In other terms, these interventions positively affect diabetes treatment. An increase in medication-taking behavior can shape overall patient compliance with treatment. The patient compliance, as measured with the MARS questionnaire, is presented in Table 4 [9].

Table 4. The scores of compliances with drug administration procedure among DM patients as measured using the MARS questionnaire in the first (pretest) and second (posttest) visits

Groups	Pretest	Posttest	Δ mean of posttest-pretest	p-value
Control	22.17 \pm 2.76	22.86 \pm 2.60	0.69 \pm 2.09	0.744
Treatment	20.83 \pm 3.31	24.18 \pm 1.73	3.44 \pm 3.45	0.000**

The Wilcoxon test results, the data are presented in mean \pm SD p-value: the significance between the pretest-posttest results of each group; (**) marks a significant difference

The Wilcoxon test results proved that the compliance scores between the first and second visits were insignificantly different ($p > 0.05$). It indicates the absence of an increase in patient adherence. Conversely, in the treatment group, the pretest and posttest scores were significantly different ($p < 0.05$), meaning that the patient adherence to medication improves.

These results correspond with several previous studies. For instance, providing brief counseling and motivational text reminders to patients with chronic diseases has been reported to positively improve adherence to medication [12], [19]. Also, brief counseling by pharmacists has been confirmed as an effective method of increasing patient compliance. Furthermore, sending motivational text reminders can raise patients' awareness and, by proxy, adherence [19].

With the pill count, the percentage of compliance was obtained as shown in Table 5. Pill count was conducted after the intervention was completed (i.e., posttest). This technique measures patient compliance with medication and offers an objective result as a part of its advantages. Based on the pill count, there were differences in patient compliance with medication. Patients possibly still had several anti-diabetic drugs from the previous month (before the research), which then affected the compliance score measured in the following month (during the research). Meanwhile, based on the MARS questionnaire, patients showed improved compliance with medication after receiving brief counseling by pharmacists and motivational text reminders. This finding confirms that pharmacists play a crucial role in the treatment of diabetic patients.

Table 5. The compliance (%) of DM patients with medication based on pill count in the first (pretest) and second (posttest) visits

	Control group	Treatment group	p-value
Mean percentage of patient compliance with medication	69.64±27.66	83.63±16.59	0.096

The Wilcoxon test results, the data are presented in mean±SD

p-value: the significance between the mean percentages of patient compliance in the two groups

This study reveals that the provision of brief pharmacist counseling accompanied by a motivational reminder message can contribute to the treatment of diabetes mellitus patients. Motivational text reminder messages sent via WhatsApp (WA) or SMS can improve treatment behavior and medication adherence in the treatment group ($p < 0.05$). However, the results of the matching between the level of adherence based on the MARS questionnaire with the physical amount of the drug (pill count) are still a limitation in this study, indicated by the p-value > 0.05 .

The role of pharmacist education based on text messages using either the WA or SMS platform shows one of the educational models that is quite affordable in terms of cost and give the impact on adherence level [20], [21]. This is in line with Haider research [22]. It showed that text message-based education is effective in improving DM management, both lifestyle management and medication adherence. In the other hands, pharmacist counselling also improve controlling blood sugar level and increase the quality of life of diabetic patients [10]. Further research is needed regarding the development of pharmacist intervention models related to educational media and digital literacy-based medication reminder messages. Opportunities in using smartphone apps-based e-health showed that they are quite effective in managing DM patients, especially increasing compliance [23], [24].

Education related to lifestyle, both medication adherence, diet management, is needed in the management of diabetes mellitus [25]. Several factors such as low adherence, inadequate support and motivation in the disease management, can contribute to uncontrolled blood glucose levels of patients [26]. The intervention in the form of technology-based education is considered to be able to improve diabetes therapy management. One of them is m-health education based on text messages. The provision of a text message-based reminder intervention showed that it was able to increase the adherence of DM patients, this is in line with the research of Arao *et al.* [26], [27].

The other factors that influence medication adherence are perception of illness, health literacy, self-efficacy and psychosocial factors, both personal and cultural beliefs. This is associated with the aspect of religiosity [28]. In this study, a motivational message was given which included a religious message. Lifestyle settings in the form of diet in the management of diabetes mellitus are associated with religious, family, psychosocial, financial and personal factors. The ADA states that the dietary management of DM patients also takes into account the culture of the population and religion. Although in the study of Katsaridis Savvas *et al.* it showed that Muslims and Christians did not show significant differences regarding adherence to dietary behavior management [25]. Research related to religious coping conducted by Maguna Made *et al.* showed that there was a significant relationship between religious coping and medication adherence also quality of life [29]. Based on this data that religious motivational messages can contribute to medication adherence and management of the lifestyle or behavior of DM patients.

The provision of repeated interventions such as reminder messages and educational messages was shown to be more effective in increasing compliance and changing behavior. Li [30] showed that patient compliance was higher in the group that was given the SMS reminder intervention five times per week than three times per week. In addition, patient-centered care (PCC) recommend several things to improve patient

therapy adherence, including increasing understanding of health literacy, simplifying therapy (avoiding polypharmacy), communication and motivation from health workers, increasing social support, and maximizing the use of technology in educational interventions and reminders [31].

4. CONCLUSION

The combination of modified brief counseling-5A by pharmacists and motivational text reminders containing religious aspect triggers a positive transformation (Δ) in the stage of behavior change (by 2.76 ± 1.59) and compliance of DM patients with medication (by 3.44 ± 3.45). For this reason, such combination plays a positive role in diabetes therapy management. The study suggests that patient counselling using religious and motivational aspect provided by pharmacists may help improve patient's management about the disease and influences the patient's medication adherence and improving glycemic control and prevention of further complications of the disease.

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REFERENCES

- [1] K. Ogurtsova *et al.*, "IDF Diabetes Atlas: Global estimates for the prevalence of diabetes for 2015 and 2040," *Diabetes Research and Clinical Practice*, vol. 128, pp. 40–50, 2017, doi: 10.1016/j.diabres.2017.03.024.
- [2] J. Oliver, *Guidelines for the Prevention, Management and Care of Diabetes Mellitus*, vol. 53, no. 9. 2013.
- [3] Indonesian Ministry of Health, "Pharmaceutical care for diabetes mellitus (In Indonesia: *Pharmaceutical care untuk penyakit diabetes mellitus*)," *Departemen Kesehatan RI*, pp. 1–89, 2005.
- [4] American Diabetes Association, "Standard medical care in diabetes 2018," *The journal of clinical and applied research and education*, vol. 41, no. January, 2018, doi: 10.2337/dc18-Sint01.
- [5] E. P. Chow, M. A. Hassali, F. Saleem, and H. Aljadhey, "Effects of pharmacist-led patient education on diabetes-related knowledge and medication adherence: A home-based study," *Health Education Journal*, vol. 75, no. 4, pp. 421–433, 2016, doi: 10.1177/0017896915597021.
- [6] N. R. Al Mazroui, M. M. Kamal, N. M. Ghabash, T. A. Yacout, P. L. Kole, and J. C. McElnay, "Influence of pharmaceutical care on health outcomes in patients with Type 2 diabetes mellitus," *British Journal of Clinical Pharmacology*, vol. 67, no. 5, pp. 547–557, 2009, doi: 10.1111/j.1365-2125.2009.03391.x.
- [7] J. Shareef and J. Fernandes, "Evaluating the effect of pharmacist's delivered counseling on medication adherence and glycemic control in patients with diabetes mellitus," *Journal of Diabetes & Metabolism*, vol. 07, no. 03, 2016, doi: 10.4172/2155-6156.1000654.
- [8] A. Mary Swaroop, C. Varghese, J. Jose, and P. Kalra, "Impact of patient counselling on knowledge, attitude, practice and medication adherence in type 2 diabetes mellitus patients," *European Journal of Pharmaceutical and Medical Research*, vol. 3, no. 4, pp. 231–235, 2016.
- [9] G. Z. Saputri, A. Akrom, M. Muhlis, and A. Muthoharoh, "(In Indonesia: *Efek konseling menggunakan brief counseling 5a modifikasi disertai pesan motivasi farmasi dalam peningkatan perilaku dan outcome klinik pasien diabetes melitus dengan hipertensi rawat jalan di Rsud Panembahan Senopati, Bantul*)," *Indonesian Journal of Clinical Pharmacy*, vol. 8, no. 1, 2019, doi: 10.15416/ijcp.2019.8.1.31.
- [10] O. M. Sari, G. Z. Saputri, and Akrom, "Diabetes mellitus patients' fasting blood sugar levels and quality of life following brief pharmacist counseling with reminders and motivational messages," *International Journal of Basic & Clinical Pharmacology*, vol. 11, no. 1, p. 13, 2021, doi: 10.18203/2319-2003.ijbcp20214885.
- [11] P. E. Trivana, "the effect of brief counseling on behavior level, adherence adherence, therapeutic outcomes and quality of life of diabetes mellitus patients with hypertension in the outpatient polyclinic of the Jember Plantation Hospital Clinic (In Indonesia: *Pengaruh b*)," *Repository.Unej.Ac.Id*, 2019.
- [12] M. A. Muslimin, A. A. P. Setiadi, and Y. I. Wibowo, "Effect of brief counseling 5A modification on compliance and blood sugar levels of patients with type 2 diabetes mellitus at Sawerigading Hospital, Palopo City (In Indonesia: *Pengaruh Brief counseling modifikasi 5A terhadap kepatuhan dan kadar gula darah, Palopo City*)" *Jurnal Pharmascience*, vol. 8, no. 2, p. 149, 2021, doi: 10.20527/jps.v8i2.11355.
- [13] J. Thakkar *et al.*, "Mobile telephone text messaging for medication adherence in chronic disease a meta-analysis," *JAMA Internal Medicine*, vol. 176, no. 3, pp. 340–349, 2016, doi: 10.1001/jamainternmed.2015.7667.
- [14] P. Darvyri, S. Christodoulakis, M. Galanakis, A. G. Avgoustidis, A. Thanopoulou, and G. P. Chrousos, "On the role of spirituality and religiosity in type 2 diabetes mellitus management—a systematic review," *Psychology*, vol. 09, no. 04, pp. 728–744, 2018, doi: 10.4236/psych.2018.94046.
- [15] A. M. P. Alfian, R., Putra, "Test the validity and reliability of the medication adherence report scale (MARS) questionnaire for patients with diabetes mellitus (In Indonesia: *Uji validitas dan reliabilitas kuesioner medication adherence report scale (MARS) terhadap pasien diabetes mellitus*)," *Jurnal Ilmiah Ibnu Sina*, vol. 2, no. 2, pp. 176–183, 2017.
- [16] W. Adikusuma and N. Qiyaam, "Adherence level and blood sugar control of type 2 diabetes mellitus patients who gets counseling and short messages service as reminder and motivation," *Asian Journal of Pharmaceutical and Clinical Research*, vol. 11, no. 2, pp. 219–222, 2018, doi: 10.22159/ajpcr.2018.v11i2.22988.
- [17] ACPM, "Coaching and counseling patients a resource from the american college of preventive medicine a clinical reference," *American College of Preventive Medicine*, pp. 1–56, 2009.
- [18] S. Notoatmodjo, *Health promotion and behavioral science (In Indonesia: Promosi kesehatan dan ilmu perilaku)*. Jakarta: Rineka Cipta, 2014.




- [19] Akrom and A. Nurwijayanti, "Brief counseling and mobile phone short message service (SMS) increase patient compliance," *International Journal of Pharma Medicine and Biological Sciences*, vol. 4, no. 3, pp. 175–179, 2015, doi: 10.18178/ijpmb.4.3.175-179.
- [20] Y. Suffiana, F. Rahmawati, and T. M. Andayani, "The effect of medication reminder chart on level of adherence in diabetes mellitus type 2 patients at rsud Sleman Yogyakarta," *Indonesian Journal of Pharmacy*, vol. 28, no. 2, pp. 125–130, 2017, doi: 10.14499/indonesianjpharm28iss2pp125.
- [21] M. I. N. A. Wibowo, D. Setiawan, N. D. Ikhwanati, and F. A. Sukma, "The effect of counseling and medication reminder aids on medication adherence and clinical outcomes of patients with diabetes mellitus and hypertension (In Indonesia: *Pengaruh konseling dan alat bantu pengingat pengobatan terhadap kepatuhan minum obat dan outcome klinik pasien diabetes melitus dan hipertensi*)," *Jurnal Ilmu Kefarmasian Indonesia*, vol. 18, no. 2, pp. 169–176, 2020.
- [22] R. Haider, L. Sudini, C. K. Chow, and N. W. Cheung, "Mobile phone text messaging in improving glycaemic control for patients with type 2 diabetes mellitus: A systematic review and meta-analysis," *Diabetes Research and Clinical Practice*, vol. 150, no. August 2018, pp. 27–37, 2019, doi: 10.1016/j.diabres.2019.02.022.
- [23] Z. Huang, E. Lum, G. Jimenez, M. Semwal, P. Sloom, and J. Car, "Medication management support in diabetes: A systematic assessment of diabetes self-management apps," *BMC Medicine*, vol. 17, no. 1, pp. 1–12, 2019, doi: 10.1186/s12916-019-1362-1.
- [24] F. Yasmin *et al.*, "The influence of mobile phone-based health reminders on patient adherence to medications and healthy lifestyle recommendations for effective management of diabetes type 2: A randomized control trial in Dhaka, Bangladesh," *BMC Health Services Research*, vol. 20, no. 1, pp. 1–12, 2020, doi: 10.1186/s12913-020-05387-z.
- [25] S. Katsaridis *et al.*, "Low reported adherence to the 2019 american diabetes association nutrition recommendations among patients with type 2 diabetes mellitus, indicating the need for improved nutrition education and diet care," *Nutrients*, vol. 12, no. 11, pp. 1–17, 2020, doi: 10.3390/nu12113516.
- [26] S. Ashrafzadeh and O. Hamdy, "Patient-driven diabetes care of the future in the technology era," *Cell Metabolism*, vol. 29, no. 3, pp. 564–575, 2019, doi: 10.1016/j.cmet.2018.09.005.
- [27] R. K. Arao *et al.*, "Strengthening value-based medication management in a free clinic for the uninsured: Quality interventions aimed at reducing costs and enhancing adherence," *BMJ Open Quality*, vol. 6, no. 2, p. e000069, 2017, doi: 10.1136/bmjopen-2017-000069.
- [28] W. Shahin, G. A. Kennedy, and I. Stupans, "The impact of personal and cultural beliefs on medication adherence of patients with chronic illnesses: A systematic review," *Patient Preference and Adherence*, vol. 13, pp. 1019–1035, 2019, doi: 10.2147/PPA.S212046.
- [29] M. M. Putra, K. S. Mariani, and N. N. A. Ratnadi, "Religious coping, medication adherence and quality of life for diabetes mellitus patients," *Indonesian Journal of Community Health Nursing*, vol. 6, no. 1, p. 18, 2021, doi: 10.20473/ijchn.v6i1.26663.
- [30] A. Li, M. Cunich, N. Fuller, K. Purcell, A. Flynn, and I. Caterson, "Improving adherence to weight-loss medication (liraglutide 3.0 mg) using mobile phone text messaging and healthcare professional support," *Obesity*, vol. 28, no. 10, pp. 1889–1901, 2020, doi: 10.1002/oby.22930.
- [31] L. R. Martin, C. Feig, C. R. Maksoudian, K. Wysong, and K. Faasse, "A perspective on nonadherence to drug therapy: Psychological barriers and strategies to overcome nonadherence," *Patient Preference and Adherence*, vol. 12, pp. 1527–1535, 2018, doi: 10.2147/PPA.S155971.

BIOGRAPHIES OF AUTHORS






Ginanjar Zukhruf Saputri    is a lecturer on Pharmacy Faculty of Universitas Ahmad Dahlan, Indonesia. She has interest research topics about clinical pharmacy, social and community pharmacy, especially about development of pharmaceutical care intervention such as counseling method using Brief Counseling 5A, and improving adherence of medication using reminder and motivational messages in hypertension and Diabetes Mellitus patients. She can be contacted at email: zukhruf.alparslan@gmail.com.



Okta Muthia Sari    is a lecturer in Pharmacy Study Program of Faculty of Mathematics and Natural Sciences, Lambung Mangkurat University, Banjarbaru, Indonesia. She has interest topics about social and community pharmacy, also clinical pharmacy. Her research about development of counseling method, adherence of medication and quality of life of hypertension and diabetes mellitus patient. She can be contacted at email: muthiaoktasari@gmail.com.



Akrom Akrom    is a lecturer in Pharmacology and Clinical Pharmacy on Faculty Pharmacy, Universitas Ahmad Dahlan, Indonesia. His interest research topics are about imunopharmacology, pharmacoepidemiology biomelecular, and about evidence based medicine. He also focused on pytomedicine immunopharmacology, chemopreventive immunopharmacology, health technology asesment and medication error in the hospital and primary health care, the development of pharmaceutical care intervention method for chronic disease (asthma, hypertension, diabetes, COPD, and HIV-AIDS), and about survey on smoking as a risk factor for chronic diseases. He can be contacted at email: akrom@pharm.uad.ac.id.

HASIL CEK_Effects of Modified Brief Counseling-5A and Religious Motivational SMS on Medication-Taking Behavior and Compliance of Diabetes Mellitus Patients

by Ginanjar Zukhruf Saputri Ginanjar Zukhruf Saputri, Okta Muthia S,
Akrom

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Effects of Modified Brief Counseling-5A and Religious Motivational SMS on Medication-Taking Behavior and Compliance of Diabetes Mellitus Patients

Ginanjar Zukhruf Saputri¹, Okta Muthia S², Akrom¹

¹Faculty of Pharmacy, Universitas Ahmad Dahlan, Yogyakarta, Indonesia

² Faculty of Math and Science, University of Lambung Mangkurat, Kalimantan, Indonesia

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ABSTRACT (10 PT)

Compliance with treatment determines whether the therapeutic target of Diabetes Mellitus (DM), that is, blood glucose control, is achieved. Since knowledge of DM management can improve adherence in medication-taking behavior, counseling by pharmacists is believed to contribute to its better acquisition. Nevertheless, many counseling and reminder media are still currently developed. This study was intended to identify the effects of brief counseling with 5A modification and a motivational reminder through short message services (SMS), designed with a religious approach, on medication-taking behavior and adherence among DM outpatients at Jetis 1 Community Health Center, Bantul, Yogyakarta. This quasi-experimental study employed a pretest-posttest control group design, and the data were collected prospectively from the outpatients from 4 July to August 2018. After signing an informed consent form, 72 patients who met the inclusion criteria were divided evenly into two groups, namely the treatment group and the control group. Patients who were pregnant or audibly impaired were excluded. The data acquisition involved interviews using two sets of questionnaires on medication-taking behavior and the Medication Adherence Rating Scale (MARS). The levels of medication-taking behavior and compliance were statistically assessed using the Wilcoxon test. The results showed that brief counseling-5A, combined with religious motivational SMS, raised the stage of behavior change in DM patients. There were increases (Δ) in medication-taking behavior by 2.76 ± 1.59 and patient compliance by 3.44 ± 3.45 . In conclusion, brief counseling-5A by pharmacists and motivational text reminders can improve the medication-taking behavior and compliance of DM patients with the therapy.

Keywords: diabetes, counseling, short messages, medication-taking behavior, compliance

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Corresponding Author:

Yu-Tzu Wu
EACH: The Centre for Research in Ageing and Cognitive Health, University of Exeter
South Cloisters, St Luke's Campus, Exeter, EX1 2LU, United Kingdom
Email: Y.Wu3@exeter.ac.uk

1. INTRODUCTION

The International Diabetes Federation (IDF) states that, in 2015, up to 415 million people from the age range of 20-79 years suffered from diabetes mellitus (DM), and 10 million of them were Indonesian [1].

DM management comprises lifestyle modification, regular drug administration, and routine doctor visits as part of health control[2]. The ultimate purpose is to control blood glucose levels and improve the quality of life of DM patients[3,4]. However, blood sugar control may not be optimal because of several factors, including inadequate knowledge and low medication adherence [5].

Previous studies have shown that counseling by pharmacists significantly shapes the outcome of the treatment of diabetes mellitus patients [6],[5],[7],[8]. Mulyanti (2014) claims that brief counseling by pharmacists can help to improve medication-taking behavior by 24.58%, adherence to medication by 10%, and the quality of life of DM-hypertensive patients at a district hospital in Panembahan, Bantul by 5.89% [9]. Thakkar *et al.* (2016) suggest that in addition to counseling, sending short messages to patients with chronic diseases can raise their compliance from 50% to 67.8% (17.8% increase). Also, the other advantages are that SMS is easy to use and can deliver information immediately with unlimited coverage [10].

Brief counseling-5A is a modified model of brief counseling by pharmacists. Combined with a text reminder to hypertensive patients, it has been reported to exhibit a positive outcome, that is, improved quality of life [11]. A further investigation in Saputri *et al.* (2019) reveals that the levels of behavior of the treatment group 1 (brief counseling-5A) and treatment group 2 (brief counseling-5A + motivational SMS) have more significant proportions (21.2% each) than that of the control group (12.1%) [12].

For the reasons above, brief counseling by pharmacists and motivational reminder via SMS positively contribute to the successful treatment of hypertensive diabetic inpatients. Nevertheless, there is still a lack of research on both types of intervention at community health centers. In Indonesia, primary medical care serves as the first destination of referral for, among others, DM patients and is offered in level-1 facilities, such as community health centers. According to the Health Profile of Bantul Regency, diabetes is included in the top 10 diseases at the community health centers and the number of visits has increased compared to the previous year [3]. Jetis 1, Bantul community health centers showed the higher visit rates for diabetic patients. The high number of patient visits causes time constraints in the interaction between patients and the pharmacy. Based on the ADA (2018), diabetic patients are patients who need to be counseled by pharmacists regarding their treatment. Brief counseling is recommended in implementing health behavior change counseling in primary health facilities such as community health centers.

Therefore, a study of brief counseling by pharmacists, together with motivational reminders via text messages, for DM outpatients at community health centers becomes necessary. This study develops the brief counseling-5A model and combines it with motivational SMS. Aside from diabetes mellitus and its treatment, counseling incorporates religious aspects. Through a systematic review, Darvyri *et al.* (2018) propose that religion or religiosity contributes to the efficacy of type-2 diabetes treatment as it helps in achieving better blood sugar control [13].

2. METHOD (10 PT)

Explaining research chronological, including research design, research procedure (in the form of algorithms, Pseudocode or other), how to test and data acquisition [5]–[7]. The description of the course of research should be supported references, so the explanation can be accepted scientifically [3], [4] Figures 1-2 and Table 1 are presented center, as shown below and cited in the manuscript [5], [8]–[13]. Figure 2. Religiosity, spirituality and subjective well being according sex. The graph gender of religiosity has been illustrated in Figure 2(a) and graph of spiritualit has been illustrated in Figure 2(b).

This study has been approved by the Ethics Committee of Ahmad Dahlan University (KEP UAD) with EC No. 011802025. It employed a quasi-experimental technique, particularly randomized pretest-posttest design with control and treatment groups. The control group underwent the usual care, while the treatment group received brief counseling-5A and motivational SMS. The data were collected prospectively and by filling out the questionnaires and health assessment sheets.

Instruments

The content of the brief counseling-5A model was redeveloped for DM patients and to incorporate a religious approach. It refers to a previous study on Brief Counseling-5A for Patients with DM-Hypertension [12]. The modified brief counseling-5A was a pharmaceutical intervention that was delivered in a focus group discussion (FGD). In this study, the questionnaire on medication-taking behavior was developed from a previous

study, i.e., Saputri et al. (2019), by adjusting the content to the research subject, namely DM patients. The next step was validity testing by experts like doctors, pharmacists, and clinical psychologists [12].

The questionnaire on medication-taking behavior measures the cognitive, affective, and psychomotor domains of patients in the treatment. Correct answers were scored with +1, whereas the wrong ones were assigned with 0. As for questionnaire item No. 12, score 0 meant "yes", while 1 represented "no, never". The measurement results were then categorized into several stages of change in medication-taking behavior, namely pre-contemplation, contemplation, preparation, and action.

The validity and reliability tests of the first questionnaire, i.e., medication-taking behavior, involved 41 patients who had met the inclusion criteria. The former produced $r_{count} > 0.308$ for each question, while the latter yielded Cronbach's alpha of 0.738. Meanwhile, the second questionnaire that measured patient compliance adopted the Medication Adherence Rating Scale (MARS). Involving 25 in-patients with diabetes mellitus, Alfian & Putra (2017) analyze the validity and reliability of the MARS questionnaire and produce r_{count} ranging from 0.682 to 0.829 ($r > 0.396$) and Cronbach's alpha of 0.803 (≥ 0.70). In other terms, the two sets of questionnaires are valid and reliable for the measurement of medication-taking behavior and compliance among DM patients [14].

The reminder was a modified short message from the one used in Saputri et al. (2019) and Adikusuma (2018), with the addition of religious content [12],[15]. The researchers sent it by Short Messages Service (SMS) or WhatsApp messenger (WA) for one month (30 days) every morning or evening to remind patients to take their medication on time. Modification on the content of the motivational text was reviewed by doctors, pharmacists, and clinical psychologists.

Subjects

The research subjects who had fulfilled the inclusion criteria were evenly divided into two groups, namely the control group (receiving the usual care from the pharmacists at the community health center) and the treatment group (receiving brief counseling-5A and motivational SMS from the researchers). The inclusion criteria were outpatients at Jettis 1 community health center aged 18 years old and diagnosed with type 2 diabetes mellitus (DM) with or without comorbidities during the research period. Also, they had to receive at least one oral anti-diabetic drug in the past three months, have and be able to use mobile phones (read and reply to messages), and be willing to participate in the research by signing an informed consent form. Meanwhile, the exclusion criteria were pregnancy and hearing impairment. Some patients were categorized as lost to follow-up due to incomplete participation, withdrawal from the study, and death.

The control group underwent the usual care from the pharmacists at the community health center, while the treatment group received the modified brief counseling-5A and motivational reminder in the form of short messages. Before (pretest, first meeting) and after (posttest, second meeting) these treatments, the medication-taking behavior and compliance of the respondents were assessed.

Statistical Analysis

The validity test used Pearson's correlation coefficient, while the reliability (consistency) test was based on Cronbach's alpha. The Wilcoxon test aimed to identify the presence or absence of shifts in the stages of medication-taking behavior before and after the intervention (significant $p < 0.05$) and quantify the average scores of patient's medication-taking behavior and compliance.

3. RESULTS AND DISCUSSION

A total of 72 patients met the inclusion criteria and were randomly divided into two groups, namely control (n=36) and treatment (n=36). Thirty-four (34) patients in the treatment group participated until the end of the research, whereas the other two were categorized into lost to follow-up as they were outside the study site.

The demographic characteristics of these respondents are presented in Table 1. The majority of the patients in the treatment group were ≤ 55 years old (61.1%), whereas those in the control group were mostly > 55 years old (69.4%). In both groups, women were dominant, i.e., 75% in the control group and 72.2% in the treatment group. Most respondents undertook ≤ 12 years of education, and a large proportion of them was unemployed. Almost all respondents had comorbidities but no family history of DM. In the treatment group, more than half of the patients had a history of DM for ≤ 5 years (58.3%). On the contrary, 52.8% of the respondents in the control group had to deal with DM for > 5 years. A higher number of patients in both groups practiced glucose/carbohydrate diet and had exercise habits.

Brief counseling by pharmacists was delivered depending on the assessment results of the respondents' condition, i.e., stages of behavior change. The average time of the brief counseling was 27.84 ± 6.78 minutes (mean \pm SD). Sending the SMS means supporting said counseling, which took place in categorically limited time. Also, the SMS contained motivational reminders that helped patients to remember taking their medicine while receiving encouragement to continue the treatment.

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Table I. The characteristics of diabetic patients in the control and treatment groups at Jetis 1 Community Health Center, Bantul from May to August 2018

No	Characteristics	Control Group		Treatment Group		
		Frequency	Percentage (%)	Frequency	Percentage (%)	
	Total	36	100	36	100	
1	Age	≤55 years old	11	30,6	22	61,1
		>55 years old	25	69,4	14	38,9
2	Sex	Male	9	25	10	27,8
		Female	27	75	26	72,2
3	Education	≤12 years	33	91,7	29	80,6
		>12 years	3	8,3	7	19,4
4	Occupation	Employed	14	38,9	17	47,2
		Unemployed	22	61,1	19	52,8
5	Comorbidity	Yes	27	75	23	63,9
		No	9	25	13	36,1
6	Family History of DM	Yes	16	44,4	18	50
		No	20	55,6	18	50
7	Duration of DM	≤5 years	17	47,2	21	58,3
		>5 years	19	52,8	15	41,7
8	Anti diabetic oral	Monotherapy	22	61,1	17	47,2
		Combination	14	38,9	19	52,8
9	Exercise	No	24	66,7	29	80,6
		Yes	12	33,3	7	19,4
10	Diet glucose/ carbohydrate	No	3	8,3	10	27,8
		Yes	33	91,7	26	72,2
11	IMT	<25 kg/m ²	24	66,7	19	52,8
		≥25 kg/m ²	12	33,3	17	47,2
12	Medication-taking behavior	Mean ± SD	8,78 ± 2,29	8,12 ± 1,98		
13	Compliance	Mean ± SD	22,17 ± 2,76	20,83 ± 3,3		
14	Fasting blood sugar level	Mean ± SD (mg/dL)	192,84 ± 75	188,41 ± 65,57		

Short messages were sent for approximately 30 days, with the following details: sent daily for the first two weeks and, then, every three days in the next two weeks. A total of 18 patients received motivational text via WhatsApp messenger, while the other 16 patients via SMS. After receiving short messages, patients were encouraged to confirm. The average number of those who did is presented in Figure 1.

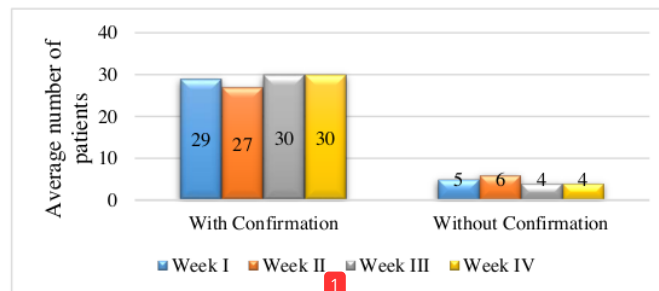


Figure 1. The number of diabetic patients at Jetis 1 Community Health Center in Bantul who confirmed after receiving motivational reminders from May to August 2018

Notes:

- Week I: the short messages were sent daily
- Week II: the short messages were sent daily
- Week III: the short messages were sent every three days
- Week IV: the short messages were sent every three days
- Total: 34 patients

The above graph shows that most patients responded to motivational text reminders. In the second week, in which the short messages were sent daily, the number of received confirmations decreased from 29 to 27 patients. On the contrary, in the third and fourth weeks, this number did not experience any decrease. In other words, all patients in the third week continued to confirm that they had received the text reminders that were sent every three days until the last week. The time that they took to reply was around 20-120 minutes.

Based on Mann Whitney's analysis results, there was no statistically significant difference in the number of confirmations between the motivational text reminders sent every day and every three days ($p>0.05$). It indicates that the total confirmation received in Week I-II and Week III-IV is categorically similar. Based on this, the level of patient response between giving motivational reminder messages both when giving motivational reminder messages every day, and every 3 days can be taken into consideration in the preparation of intervention media in future studies. It is still necessary to develop an intervention model such as an e-reminder application based on a mobile health application that can practically show the patient's response.

One of the processes in brief counseling-5A is assessment, which involves assessing the condition of patients to determine their level of readiness to behavior change. Brief counseling by pharmacists was delivered based on the stage of transformations in medication-taking behavior. ACPM (2009) proposes four steps of behavior change, namely pre-contemplation, contemplation, preparation, and action. After brief counseling by pharmacists, the target patients were expected to show a step-up to the next stage, as well as a high score of medication-taking behavior [16]. The steps of behavior change of the control and treatment groups are summarized in Table II.

Table II. The stages of behavior change of diabetic patients belonging to the control and treatment groups at Jetis 1 Community Health Center in Bantul from May to August 2018, as observed in the first (pretest) and second (posttest) meeting

Stage of behavior change	Pretest		Posttest		p-value
	N	%	N	%	
Control Group					
Pre-contemplation	30	83,3	29	80,6	0,773
Contemplation	1	2,8	3	8,3	
Preparation	4	11,1	4	11,1	
Action	1	2,8	0	0	
Intervention Group					
Stage of behavior change	Pre test		Post test		p-value
	N	%	N	%	
Pre-contemplation	32	88,9	10	27,8	0,000**
Contemplation	3	8,3	0	0	
Preparation	1	2,8	13	36,1	
Action	0	0	11	30,6	

The Wilcoxon test; a decrease in behavior change in 4 respondents, a constant stage in 28 respondents, and an increase in 4 respondents.

P-value: the significance between the pretest-posttest results of each group; (**) marks a significant difference

The Wilcoxon test revealed that the stages of change in medication-taking behavior varied among the patients in the control group. As many as four (4) respondents showed a decrease, 28 patients did not experience any changes in their behavior, and another four (4) respondents exhibited an increase. Based on the test result, there were no significant shifts (neither increase nor decrease) in the stage of behavior change in this group ($p>0.05$). This finding is in line with Muthoharoh (2017) [17].

Combining brief counseling by pharmacists with motivational text reminders theoretically encourages improvement in patient's medication taking behavior. The different behaviors that the patients exhibited in the first and second visits are presented in Table III.

Table III. The score of medication-taking behavior of diabetic patients at Jetis 1 Community Health Center from May to August 2018, as observed in the first (pretest) and second (posttest) meeting

Groups	Pretest	Posttest	Δ mean of posttest-pretest	p-value
Control	8.78 \pm 2.29	8.81 \pm 2.03	0.02 \pm 1.66	0.744
Treatment	8.11 \pm 1.94	10.88 \pm 1.22	2.76 \pm 1.59	0.000**

The Wilcoxon test results, the data are presented in mean \pm SD

P-value: the significance between the pretest-posttest results of each group; (**) marks a significant difference

The Wilcoxon test of the control group proved that the scores of medication-taking behaviors measured in the pretest and posttest were insignificantly different ($p>0.05$). Accordingly, the patients included

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in this group exhibited no behavior improvement. On the contrary, the treatment group showed a significant increase in behavior between the pretest and the posttest ($p < 0.05$). This outcome is potentially caused by brief counseling-5A that has led to an increase in knowledge or understanding of proper treatment. Notoatmodjo (2012) believes that, theoretically, behavior change through the process of knowledge transformation is followed by attitudes and, then, behavior change. Moreover, Swaroop et al. (2016) have reported that counseling by pharmacists can improve patients' knowledge about the disease and its treatment and, consequently, affect the attitudes, as well as practices, of said patients toward the disease [18],[19].

As a conclusion, the medication-taking behavior score of patients significantly increases after receiving modified brief counseling-5A and motivational text reminders. In other terms, these interventions positively affect diabetes treatment.

An increase in medication-taking behavior can shape overall patient compliance with treatment. The patient compliance, as measured with the MARS questionnaire, is presented in Table IV [12].

Table III. The scores of compliances with drug administration procedure among DM patients at Jetis 1 Community Health Center, Bantul, as measured using the MARS questionnaire in the first (pretest) and second (posttest) visits

Groups	Pretest	Posttest	Δ mean of posttest-pretest	<i>p</i> -value
Control	22.17±2.76	22.86±2.60	0.69±2.09	0.744
Treatment	20.83±3.31	24.18±1.73	3.44±3.45	0.000**

The Wilcoxon test results, the data are presented in mean±SD

P-value: the significance between the pretest-posttest results of each group; (**) marks a significant difference

The Wilcoxon test results proved that the compliance scores between the first and second visits were insignificantly different ($p > 0.05$). It indicates the absence of an increase in patient adherence. Conversely, in the treatment group, the pretest and posttest scores were significantly different ($p < 0.05$), meaning that the patient adherence to medication improves.

These results correspond with several previous studies. For instance, providing brief counseling and motivational text reminders to patients with chronic diseases has been reported to positively improve adherence to medication [9],[20]. Also, brief counseling by pharmacists has been confirmed as an effective method of increasing patient compliance. Furthermore, sending motivational text reminders can raise patients' awareness and, by proxy, adherence [20].

With the pill count, the percentage of compliance was obtained. Pill count was conducted after the intervention was completed (i.e., posttest). This technique measures patient compliance with medication and offers an objective result as a part of its advantages.

Based on the pill count, there were differences in patient compliance with medication. Patients possibly still had several anti-diabetic drugs from the previous month (before the research), which then affected the compliance score measured in the following month (during the research).

Meanwhile, based on the MARS questionnaire, patients showed improved compliance with medication after receiving brief counseling by pharmacists and motivational text reminders. This finding confirms that pharmacists play a crucial role in the treatment of diabetic patients.

Table IV. The compliance (%) of DM patients with medication based on pill count in the first (pretest) and second (posttest) visits

	Control Group	Treatment Group	<i>p</i> -value
Mean percentage of patient compliance with medication	69.64±27.66	83.63±16.59	0.096

The Wilcoxon test results, the data are presented in mean±SD

P-value: the significance between the mean percentages of patient compliance in the two groups

Based on this study, the provision of brief pharmacist counseling accompanied by a motivational reminder message can contribute to the treatment of diabetes mellitus patients. Motivational text reminder messages sent via WA or SMS can improve treatment behavior and medication adherence in the treatment group ($p < 0.05$). However, the results of the matching between the level of adherence based on the MARS questionnaire with the physical amount of the drug (pill count) are still a limitation in this study, indicated by the p value > 0.05 .

The role of pharmacist education based on text messages using either the WA or SMS platform shows one of the educational models that is quite affordable in terms of cost. This is in line with Haidar Rabia's research (2019) showed that text message-based education is effective in improving DM management, both lifestyle management and medication adherence [21]. In the other hands, pharmacist counselling also improve controlling blood sugar level and increase the quality of life of diabetic patients [22]. Further research is needed regarding the development of pharmacist intervention models related to educational media and digital literacy-based medication reminder messages. Opportunities in using smartphone apps-based e-health showed that they are quite effective in managing DM patients, especially increasing compliance [23].

Education related to lifestyle, both medication adherence, diet management, is needed in the management of diabetes mellitus [24]. Several factors such as low adherence, inadequate support and motivation in the disease management, can contribute to uncontrolled blood glucose levels of patients [25]. The intervention in the form of technology-based education is considered to be able to improve diabetes therapy management. One of them is m-health education based on text messages. The provision of a text message-based reminder intervention showed that it was able to increase the adherence of DM patients, this is in line with the research of Arao et al (207) [25] [26].

The other factors that influence medication adherence are perception of illness, health literacy, self-efficacy and psychosocial factors, both personal and cultural beliefs. This is associated with the aspect of religiosity [27]. In this study, a motivational message was given which included a religious message. Lifestyle settings in the form of diet in the management of diabetes mellitus are associated with religious, family, psychosocial, financial and personal factors. The ADA states that the dietary management of DM patients also takes into account the culture of the population and religion. Although in the study of Katsaridis Savvas et al (2020) it showed that Muslims and Christians did not show significant differences regarding adherence to dietary behavior management [24]. Research related to religious coping conducted by Maguna Made et al (2021) showed that there was a significant relationship between religious coping and medication adherence also quality of life [28]. Based on this data that religious motivational messages can contribute to medication adherence and management of the lifestyle or behavior of DM patients.

The provision of repeated interventions such as reminder messages and educational messages was shown to be more effective in increasing compliance and changing behavior. Ang li (2020) showed that patient compliance was higher in the group that was given the SMS reminder intervention 5 times per week than 3 times per week [29]. In addition, patient-centered care (PCC) recommend several things to improve patient therapy adherence, including increasing understanding of health literacy, simplifying therapy (avoiding polypharmacy), communication and motivation from health workers, increasing social support, and maximizing the use of technology in educational interventions and reminders [30].

4. CONCLUSION

The combination of modified brief counseling-5A by pharmacists and motivational text reminders containing religious aspect triggers a positive transformation (Δ) in the stage of behavior change (by 2.76 ± 1.59) and compliance of DM patients with medication (by 3.44 ± 3.45). For this reason, such combination plays a positive role in diabetes therapy management.

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REFERENCES

- [1] Huang, Y., Ogurtsova, K., Fernandes, R., Cavan, D., Makaroff, L., Shaw, J., Cho, N., 2017. International Diabetes Federation Diabetes Atlas estimates for the global diabetes prevalence of adults aged 18 to 99 years. *IDF*, 1.
- [2] WHO 2017. Diabetes. Diambil dari <http://www.who.int/news-room/fact-sheets/detail/diabetes> <http://www.who.com/diabetes.html>, diakses tanggal 5 Februari 2018.
- [3] Depkes, 2005. *Pharmaceutical care untuk penyakit Diabetes Mellitus*. Departemen Kesehatan RI, Jakarta, 10-74.
- [4] ADA, 2018. Standards of Medical Care in Diabetes - 2018. *J Clin and App Res Edc : Diabetes Care*, 39, 13-50.

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- [5] Chow, E.P., Hassali, M.A., Saleem, F., Aljadhey, H., 2016. Effects Of Pharmacist-led Patient Education On Diabetes-Related Knowledge And Medication Adherence: A Home-Based Study. *Health Educ J*, 1 (13), 1–13.
- [6] Al Mazroui, N.R., Kamal, M.M., Ghabash, N.M., Yacout, T.A., Kole, P.L., McElnay, J.C., 2009. Influence of pharmaceutical care on health outcomes in patients with Type 2 diabetes mellitus. *Br J Clin Pharmacol*, 67 (5), 547–557.
- [7] Shareef, J., Fernandes, J., Samaga, L., Bhat, 2016b. Evaluating the Effect of Pharmacist's Delivered Counseling on Medication Adherence and Glycemic Control in Patients with Diabetes Mellitus. *J Diabetes & Metab* 7 (3), 3–4
- [8] Swaroop, A.M., Varghese, C., Jose, J., 2016. Patient Counseling On Knowledge, Attitude, Practice and Medication Adherence Type 2 Diabetes Mellitus Patients. *EJPMR* 3, 231–235.
- [9] Muliarti, R., 2014. Pengaruh Brief Counseling dan Short Message Service (SMS) Terhadap Tingkat Perilaku Adhrens, Kepatuhan Minum Obat dan Hasil Terapi Pasien Diabetes Mellitus Dengan Hipertensi Rawat Jalan Poliklinik Penyakit Dalam RSUD Panembahan Senapati Bantul Yogyakarta. *Tesis*. Fakultas Farmasi Universitas Ahmad Dahlan, Yogyakarta.
- [10] Thakkar, J., Kurup, R., Laba, T., Santo, K., Thiagalingam, A., Rodgers, A., 2016. Mobile Telephone Text Messaging for Medication Adherence in Chronic Disease A Meta-analysis. *JAMA Internal Medicine*, 176, 340–349.
- [11] Saputri, Z.G., 2013. Pengaruh Pemberian SMS Sebagai Pengingat Dan Motivasi Serta Konseling Farmasi Pasien Hipertensi Di Poliklinik Penyakit Dalam RS PKU Muhammadiyah Bantul. Paskasarjana Farmasi Universitas Ahmad Dahlan, Yogyakarta
- [12] Saputri, Ginanjar, et al. 2019. Efek Konseling Menggunakan Brief Counseling 5A Modifikasi Disertai Pesan Motivasional Farmasi dalam Peningkatan Perilaku dan Outcome Klinik Pasien Diabetes Melitus dengan Hipertensi Rawat Jalan di RSUD Panembahan Senapati, Bantul. *Jurnal Farmasi Klinik Indonesia*, Maret 2019, Vol. 8 No. 1, hlm 31–41
- [13] Daryyri, P., Christodoulakis, S., Galanakis, M., Avgoustidis, A.G., Thanopoulou, A., Chrousos, G.P., 2018. On the Role of Spirituality and Religiosity in Type 2 Diabetes Mellitus Management—A Systematic Review. *Sci Res Pubh Psychology*, 9 (4), 728–744.
- [14] Alfian, R., Putra, A.M.P., 2017. Uji Validitas Dan Reliabilitas Kuesioner Medication Adherence Report Scale (MARS) Terhadap Pasien Diabetes Mellitus. *JHIS*, 2 (2), 176-183
- [15] Adikusuma, W., 2018. Adherence level and blood sugar control of type 2 diabetes mellitus patients who gets counseling and short messages service as reminder and motivation. *AJPCR*, 11 (2), 219–222.
- [16] ACPM, 2009. *Coaching And Counseling Patients A Resource From The American College Of Preventive Medicine*. American College Of Preventive Medicine.
- [17] Muthoharoh, A., 2017. Pengaruh Brief Counseling 5A Dan Pesan Motivatif Dalam Meningkatkan Kualitas Hidup Pasien Diabetes Melitus Dengan Hipertensi Rawat Jalan Poliklinik Penyakit Dalam Di RSUD Panembahan Senapati Bantul. *Tesis*. Fakultas Farmasi Universitas Ahmad Dahlan, Yogyakarta
- [18] Notoatmodjo, S., 2012. *Promosi Kesehatan dan Ilmu Perilaku*. Rineka Cipta, Jakarta, 132-148.
- [19] Swaroop, A.M., Varghese, C., Jose, J., 2016. Patient Counseling On Knowledge, Attitude, Practice and Medication Adherence Type 2 Diabetes Mellitus Patients. *EJPMR* 3, 231–235.
- [20] Nurwijayanti, A., 2015. Brief Counseling and Mobile Phone Short Message Service (SMS) Increase Patient Compliance. *Int J Pharm Med Bio Sci* 4 (3), 175–179.
- [21] Haidar Rabbia, Likhitha Sudini, Clara K, N Wah C. 2019. Mobile phone text messaging in improving glycaemic control for patients with type 2 diabetes mellitus: A systematic review and meta-analysis. *Diabetes Research and Clinical Practice*. Volume 150, April 2019, Pages 27-37
- [22] Muthia, Okta S, Ginanjar, and Akrom. 2022. Diabetes mellitus patients' fasting blood sugar levels and quality of life following brief pharmacist counseling with reminders and motivational messages. *International Journal of Basic & Clinical Pharmacology*. Jan;11(1):13-19
- [23] Huang Zhilian, Elaine L, Geronimo J, Monika S, Peter S, dan Josip C. 2019. Medication management support in diabetes: a systematic assessment of diabetes self-management apps. *BMC Medicine*. 17:127
- [24] Katsaridis Savvas, Maria G, Konstantinos, Christos T, Stefanos T, Anastasia G, et al. Low Reported Adherence to the 2019 American Diabetes Association Nutrition Recommendations among Patients with Type 2 Diabetes Mellitus, Indicating the Need for Improved Nutrition Education and Diet Care. *Nutrients* 2020, 12, 3516
- [25] Ashrafzadeh Sahar dan Osama hamdy. Patient-Driven Diabetes Care of the Future in the Technology Era. *Cell Metabolism*, 2019. Vol 29, issue 3, pages 564-575
- [26] R.K. Arao, M.Y. O'Connor, T. Barrett, L. Chockalingam, F. Khan, A. Kumar, et al. Strengthening value-based medication management in a free clinic for the uninsured: quality interventions aimed at reducing costs and enhancing adherence. *BMJ Open Qual.*, 6 (2017), p. e000069
- [27] Shahin Wejdan, Gerard A dan Ieva S. The impact of personal and cultural beliefs on medication adherence of patients with chronic illnesses: a systematic review. *Dove Press journal: patient Preference and Adherence*. 2019:13 1019–1035
- [28] Mahaguna Made, Kadek Siki, dan Ni Yoman A. RELIGIOUS COPING, MEDICATION ADHERENCE AND QUALITY OF LIFE FOR DIABETES MELLITUS PATIENTS. *Indonesian journal of Community Health Nursing*. Vol 6, No 1. February 2021
- [29] Li Ang, Michelle Cunich, Nicholas F, Katrina P, Allannah F, and Ian C. Improving Adherence to Weight-Loss Medication (Liraglutide 3.0 mg) Using Mobile Phone Text Messaging and Healthcare Professional Support. *Obesity Journal*. 2020. Vol 28
- [30] R Martin Leslie, Cheyyene Feig, Chole RM, Kenrick W, dan Kate F. A perspective on nonadherence to drug therapy: psychological barriers and strategies to overcome nonadherence. *Dove press. Patient Preference and Adherence*. 2018:12 1527–1535

BIOGRAPHIES OF AUTHORS

	<p>Ginanjar Zukhruf Saputri   is a lecturer on Pharmacy Faculty of Universitas Ahmad Dahlan, Indonesia. She has interest research topics about clinical pharmacy, social and community pharmacy, especially about development of pharmaceutical care intervention such us counseling method using Brief Conseling 5A, and improving adherence of medication using reminder and motivational messages in hypertension and Diabetes Mellitus patients. She can be contacted at email: zukhruf.alparslan@gmail.com</p>
	<p>Akrom     is a lecturer in Pharmacology and Clinical Pharmacy on Faculty Pharmacy, Universitas Ahmad Dahlan, Indonesia. His interest research topics are about imunopharmacology, pharmacoepidemiology biomelecular, and about evidence based medicine. He also focused on pytomedicine immunopharmacology, chemopreventive immunopharmacology, health technology asesment and medication error in the hospital and primary health care, the development of pharmaceutical care intervention method for chronic disease (asthma, hypertension, diabetes, COPD, and 2V-AIDS), and about survey on smoking as a risk factor for chronic diseases. He can be contacted at email: akrom@pharm.uad.ac.id</p>
	<p>Okta Muthia Sari   is a lecturer in Pharmacy Study Program of Faculty of Mathematics and Natural Sciences, Lambung Mangkurat University, Banjarbaru, Indonesia. She has interest topics about social and community pharmacy, also clinical pharmacy. Her research about development of counseling method, adherence of medication and quality of life of hypertension and diabetes mellitus patient. She can be contacted at email: muthiaoktasari@gmail.com</p>

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