

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Knowledge and Practice of Hand Hygiene Among Hospitalized Patients in a Tertiary General Hospital in China and Their Attitudes: A Cross-Sectional Survey
AUTHORS	LI, Yunxia; LIU, Yaohong; ZENG, Li; CHEN, Chong; MO, Dan; YUAN, Sue

VERSION 1 - REVIEW

REVIEWER	Mohamed H Yassin University of Pittsburgh USA
REVIEW RETURNED	28-Nov-2018

GENERAL COMMENTS	1) The sample size calculation is larger than the actual study * 376 vs. 310) 2) Page 9 2nd paragraph: 72% of patients did not know about HH contradicts that the majority understand that it is important (in conclusion/ abstract or discussion page 12) 3) The study is extremely simple with a very basic goal and design but I believe it was successful in its mission
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REVIEWER	Dinah Gould Cardiff University Wales UK
REVIEW RETURNED	29-Nov-2018

GENERAL COMMENTS	This is a well presented paper addressing patients' knowledge of hand hygiene in China. The paper needs some changes before it is ready for publication. You should point out that although the survey findings are interesting, they are not an indicator of how patients may actually behave in real life. The patients appear to know that hand hygiene is important even though they know little about it. Have you considered that a social desirability factor might be operating? This is an important point for the study limitations. Why do you think that hospital patients in China might know about hand hygiene in clinical practice? What information is provided to the general public and to patients when admitted? Who and how would it be given to improve the situation you describe?
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REVIEWER	Hong Bin Kim Professor Department of Internal Medicine Seoul National University College of Medicine Division of Infectious Diseases Seoul National University Bundang Hospital Republic of Korea
REVIEW RETURNED	11-Dec-2018

GENERAL COMMENTS	<p>A cross-sectional survey performed in a university-affiliated medical hospital seems to be interesting because it was designed to figure out patients' knowledge, attitude, and performance of hand hygiene. Most patients considered that hand hygiene is very important, but their knowledge and actual performance were insufficient.</p> <p>Although 'Patient hand hygiene' has not been well studied so far, several points should be clarified as below.</p> <p>1. Abstract (line 50 in page 2, 'Conclusion') The main results of this study were that patients and family members considered hand hygiene is important but they were unaware of the way of proper hand hygiene. However the authors' conclusion, 'Multifaceted and dedicated efforts are needed to improve patient hand hygiene compliance', is too general to be logically linked with the results.</p> <p>2. Introduction (line 5-13 in page 5) The authors explained the definition of patient hand hygiene (PHH) in this paragraph. This paragraph should be moved to the 'Method section'.</p> <p>3. Methods 'Participants' (in page 5-6) In case of family members to be asked for questionnaires, I am concerned if hand hygiene' attitude, performance or demographic data would be the patients' performance and information or family members'? The explanation of this should be more clarified.</p> <p>'Implementation' (line 44-45 in page 7) Although 'then distributed questionnaires to the participants and provided instructions' is described, I wondered the questionnaires was filled in by a researcher or respondents by themselves. I recommend how to fill in questionnaires should be more clarified in this part.</p> <p>4. Results I recommend the Cronbach's alpha be presented to show the reliability between relevant questions</p> <p>5. Discussion - Discussion seems to be redundant. Please be focused on the remarkable results with plausible & logical explanations. - (line 16 in page 13) The authors described 'they were unaware of why HH was important.' However, according to the previous contents, the respondents seem to know the importance of hand hygiene and dirty hands could lead to the infection or poor recovery. Therefore, I think 'they were unaware of how to wash their hands, rather than why HH is important'. - Some discussion on the results of 'significant predictors of PHH moments' is needed in the discussion section. There was insufficient discussion on the important results of 'significant predictors of PHH moments'. According to the results of</p>
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	<p>multivariate analysis, 'the patients in the medical department' showed significantly higher PHH performance, compared with 'Department of Obstetrics-Gynecology' and 'ICU', and occupation such as 'farmer' showed good PHH compared with 'clerk' or 'freelancer'. For clarification, to describe each group's characteristics such as activity or severity could be helpful.</p> <p>6. Table 1. Demographic characteristics (page 24-25) - (line 24-30, "Marital status") I wonder how 'marital status' is related with hand hygiene knowledge or performance of HH. I am afraid it is unnecessary to identify the respondents' characteristics. Rather than marital status, the length of hospital stay seems more important. While the item was included in the method section, it is not included in the Table 1. - (line 44, "Worker" in Occupation) Clarification of 'worker' is needed.</p> <p>7. Table 2. (Page 26-27) In questions of 'Handwashing ways', 'Handwashing products', 'Ways in which you wipe your hands', each number of respondents is over the total number of respondents. The reason should be noted in the footnote of this table.</p>
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VERSION 1 – AUTHOR RESPONSE

Responds to the reviewer's comments:

Reviewer #1

Reviewer Name: Mohamed H Yassin

Institution and Country: University of Pittsburgh, USA

Please state any competing interests or state 'None declared': None

1.Response to comment: The sample size calculation is larger than the actual study (376 vs. 310).

Response: Dear professor Mohamed H Yassin, thanks for your comments. In this study, the sample size we calculated was 376, and we also issued 376 questionnaires, but only 310 respondents completed the questionnaire, the total response rate was 82.4% (310 of 376). We are very sorry for the inaccurate expression, and revised it in 'RESULTS-Population characteristics' section in page 9 line 10-12 as "A total of 376 questionnaires were issued, and 310 respondents, including 242 patients (78.1%) and 68 family members/ caregivers (21.9%), completed the questionnaire." We also add a sentence in 'Abstract-results' section in page 2 line 8 as "A total of 376 questionnaires were issued, and 310 respondents completed it." Thank you.

2.Response to comment: Page 9 2nd paragraph: 72% of patients did not know about HH contradicts that the majority understand that it is important (in conclusion/ abstract or discussion page 12).

Response: Dear professor Mohamed H Yassin, thanks for your comments. We are very sorry for the contradicts expression, the exact meaning that we want to express was the patient knowledge about hand hygiene was relatively poor, but their attitude towards hand hygiene was positive, they thought

handwashing was important for disease recovery, but they were unaware of proper hand hygiene. We revised this incorrect writing in our study as following :

—In page 10 line 1-2 ('Result- 'patients' performance of hand hygiene and their knowledge and attitudes' section) as "Most of the participants (72.2%) reported that they did not know about HH knowledge or knew very little about it " ;

—In page 12 line 3-4 count backwards ('Discussion' 1st paragraph) as "Although patients had a positive attitude towards HH, their knowledge was insufficient. "

—In page 17 line 2-3 ('Conclusion' section) as "In conclusion, this study demonstrated that patients had a positive attitude towards HH. However, their levels of knowledge and practice were unsatisfactory." the same revision were made in page 2 line 1-2 count backwards in 'Abstract-conclusion' section. Thank you.

3.Response to comment: The study is extremely simple with a very basic goal and design but I believe it was successful in its mission.

Response: Dear professor Mohamed H Yassin, thanks for your comments and thanks for your approval.

Reviewer #2

Reviewer Name: Dinah Gould

Institution and Country: Cardiff University, Wales, UK

Please state any competing interests or state 'None declared': None

Dear professor Dinah Gould, thanks for your comments. We divided it into four section to answer. The comments and corresponding responses are as following:

1.Response to comment: This is a well presented paper addressing patients' knowledge of hand hygiene in China. The paper needs some changes before it is ready for publication. You should point out that although the survey findings are interesting, they are not an indicator of how patients may actually behave in real life. The patients appear to know that hand hygiene is important even though they know little about it. Have you considered that a social desirability factor might be operating? This is an important point for the study limitations.

Response: Dear professor Dinah Gould, thanks for your good comments. It is very valuable. We are very sorry for the neglect of the social desirability factor in our results explanation. We added it in page 12 line 2 count backwards in 'Discussion' section, in page 16 line 1-4 count backwards in 'Discussion' section 'limitation' paragraph. Thank you.

2.Response to comment: Why do you think that hospital patients in China might know about hand hygiene in clinical practice?

Response: Dear professor Dinah Gould, thanks for your comments. Actually, we don't think that hospital patients in China know about hand hygiene in clinical practice, that is what we just want to survey and to improve, we want to know how patients practice without provided hand hygiene information in hospital. Because little attention has been paid in patient hand hygiene in the hospital in China in the past, although almost all people pay close attention to health care workers hand hygiene.

In recent years, more and more evidence shows that most infections occur as a result of bacteria present within a patient's own flora as well as bacteria present on surfaces within the health-care environment, and CDC proposes nine moments of patient hand hygiene to prevent and decrease infection. As motioned above, we know little about patient hand hygiene in clinical practice in China, so we want to survey inpatient knowledge, as well as the attitudes towards and practice of patient hand hygiene during their hospital stay with non-provision of PHH information, and we also aim to characterize and identify some factors influencing practice compliance, which may contribute to the design of effective patient hand hygiene promotion strategies. We are very sorry for the misunderstanding caused by our unclear writing. We added this rationale in page 4 line 12-16 and in page 5 line 1-4 in 'Introduction' section. Thank you.

3. Response to comment: What information is provided to the general public and to patients when admitted?

Response: Thanks for your comments. In China, the most information that the general public accepted was washing hands before meals and after toilet, there are some advertisements on television and on internet to preach and educate people wash hands more often to prevent flu and diarrhea, especially during the cold winter and hot summer. However, there are no more information about hand hygiene were provided to patients when admitted. They were mostly enlightened to comply with the rules and regulations of the hospital, pay attention to diet and nutrition, change the unhealthy lifestyle and keep a good mood, but not provided information about how to act hand hygiene in clinical practice. The surrounding environment is different between hospital and home, there are a lot of pathogens that might be spread through the hands of patients in hospital, so it is not enough for patients only aware of wash their hands before meals and after toilet. We added

—"there were no information provided for patient when they admitted" in page 4 line 4 count backwards in 'Introduction' section ;

—"with non-provision of PHH information" in page 5 line 1-2 in 'Introduction' section ;

—"due to non-provision of any PHH information in daily life, nor in hospital after admitted, they were unaware of when and how to wash their hands in clinical practice." in page 13 line 2-4 in "Discussion" section.

Thank you.

4. Response to comment: Who and how would it be given to improve the situation you described?

Response: Thanks for your comments. As motioned in response 2 and 3, patient hand hygiene was neglected in China. It takes a lot of efforts to improve this situation. A systematical education about PHH seems necessary, not only for medical staff, but also for patients themselves. It is of great significance for patients to realize their own behavior for the prevention and control of nosocomial infection and the promotion of their own safety. Staff should receive education on the importance of PHH in the prevention of hospital-acquired infection; and staff need to be instructed to provide verbal PHH education to all newly admitted patients, and to provide reminders, assistance, and encouragement for PHH practice. In addition, it is also important to ensure that HH products—such as alcohol-based hand wipes or ABHR—are accessible to patients who are bedridden and are unable to get to the sink. Staff or family members should be instructed to provide assistance to improve PHH opportunities. We added this explanation in page 13 line 11-16 in 'Discussion' section. Thank you.

Reviewer #3

Reviewer Name: Hong Bin Kim

Institution and Country: Professor , Department of Internal Medicine , Seoul National University College of Medicine, Division of Infectious Diseases , Seoul National University Bundang Hospital , Republic of Korea

Please state any competing interests or state 'None declared': None declared

1. Response to comment: (1) Abstract - (line 50 in page 2, 'Conclusion')

The main results of this study were that patients and family members considered hand hygiene is important but they were unaware of the way of proper hand hygiene. However the authors' conclusion, 'Multifaceted and dedicated efforts are needed to improve patient hand hygiene compliance', is too general to be logically linked with the results.

Response: Thanks for your comments, dear professor Hong Bin Kim. We are very sorry for the incorrect writing. We revised this as "A systematical education about patient hand hygiene is needed in future to correct this knowledge and behavior" in page 3 line 1-2 in "Abstract-conclusion" section and in page 17 line 4 in "Conclusion" section. Thank you.

2. Response to comment: (2) Introduction - (line 5-13 in page 5)

The authors explained the definition of patient hand hygiene (PHH) in this paragraph. This paragraph should be moved to the 'Method section'.

Response: Thanks for your comments. We are very sorry for writing the definition of PHH on the incorrect section. We moved the PHH definition to "Method" section in page 5 line 9-12 as you suggested. Thank you.

3. Response to comment: (3) Methods - 'Participants' (in page 5-6)

In case of family members to be asked for questionnaires, I am concerned if hand hygiene' attitude, performance or demographic data would be the patients' performance and information or family members'? The explanation of this should be more clarified.

Response: Thanks for your comments. We are very sorry for the unclear expression. All information asked to be filled were patients' information and performance in this study. We revised in "Methods-participants" section in page 6 line 10-11. Thank you.

4. Response to comment: (3) Methods - 'Implementation' (line 44-45 in page 7)

Although 'then distributed questionnaires to the participants and provided instructions' is described, I wondered the questionnaires was filled in by a researcher or respondents by themselves. I recommend how to fill in questionnaires should be more clarified in this part.

Response: Thanks for your comments. We are very sorry for our incorrect writing. All questionnaires were filled by respondents themselves in this study. We revised this in "Methods - implementation" section in page 8 line 2-3 and line 10-12. Thank you.

5. Response to comment: (4) Results

I recommend the Cronbach's alpha be presented to show the reliability between relevant questions.

Response: Thanks for your comments. We think this is a good suggestion. Through statistical analysis, the Cronbach's alpha of the questionnaire is 0.867, which indicate a good reliability of this self-designed questionnaire. We presented it in "Results" section in page 9 line 12-13. Thank you.

6.Response to comment: (5)Discussion-

Discussion seems to be redundant. Please be focused on the remarkable results with plausible & logical explanations.

Response: Thanks for your comments. In order to interpret the findings as comprehensively as possible, this study explains all the meaningful results. However, this may lead to a lack of focus, and we accepted your suggestion. We deleted and condensed some paragraphs in the "Discussion" section. Thank you.

7.Response to comment: (5)Discussion - (line 16 in page 13)

The authors described 'they were unaware of why HH was important.' However, according to the previous contents, the respondents seem to know the importance of hand hygiene and dirty hands could lead to the infection or poor recovery. Therefore, I think 'they were unaware of how to wash their hands, rather than why HH is important'.

Response: Thanks for your comments. We are very sorry for our incorrect writing. We accept your suggestion and revised it in "Discussion" section in page 13 line 3-4. Thank you.

8.Response to comment: (5)Discussion -

Some discussion on the results of 'significant predictors of PHH moments' is needed in the discussion section. There was insufficient discussion on the important results of 'significant predictors of PHH moments'. According to the results of multivariate analysis, 'the patients in the medical department' showed significantly higher PHH performance, compared with 'Department of Obstetrics-Gynecology' and 'ICU', and occupation such as 'farmer' showed good PHH compared with 'clerk' or 'freelancer'. For clarification, to describe each group's characteristics such as activity or severity could be helpful.

Response: Thanks for your comments. We are very sorry for the neglect of discussion of different department and occupation of 'significant predictors of PHH moments', and thank you for your suggestion. Patients in 'ICU' was the worst practitioners of PHH in Univariate analysis as well as in multivariate analysis, so we discussed the department in two paragraph, firstly we explained why the patients in 'medical department' showed significantly higher PHH performance compared with 'Department of Obstetrics-Gynecology' in page 15 line 3-11, then discussed why 'ICU' patients rarely practice HH compared to those in other departments in page 15 line 12-19 and in page 16 line 1-2. The significant predictors about occupation " 'farmer' showed good PHH compared with 'clerk' or 'freelancer' " were discussed in page 16 line 3-5. We hope that we made sufficient and logical discussions. Thank you.

9.Response to comment: (6)Table 1. Demographic characteristics (page 24-25)

-(line 24-30, "Marital status")

I wonder how 'marital status' is related with hand hygiene knowledge or performance of HH. I am afraid it is unnecessary to identify the respondents' characteristics. Rather than marital status, the length of hospital stay seems more important. While the item was included in the method section, it is not included in the Table 1.

Response: Thanks for your comments. That's a good suggestion. We deleted the 'marital status' and added 'the length of hospital stay' in Table 1(in page 25 line 8-14) and Table 5(in page 31 line 20-26),

respectively; and found that there is no statistical significance in different length of hospital stay at the time the questionnaire was completed in Table 5. Thank you.

10. Response to comment: (6) Table 1. Demographic characteristics (page 24-25)

- (line 44, "Worker" in Occupation) Clarification of 'worker' is needed.

Response: Thanks for your comments. We are very sorry for our incorrect writing. In this study, 'worker' refers to an employee who performs manual or industrial labor. To be exact, the 'workman' should be called. We revised this in 'Table 1' in page 24 line 25 and 'Table 5' in page 30 the second line from the bottom. Thank you.

11. Response to comment: (7) Table 2. (Page 26-27)

In questions of 'Handwashing ways', 'Handwashing products', 'Ways in which you wipe your hands', each number of respondents is over the total number of respondents. The reason should be noted in the footnote of this table.

Response: Thanks for your comments. We are very sorry for the neglect of the footnote of these three items you mentioned. We added a footnote at the bottom of 'Table 2' in page 27 as you suggested. Thank you.

Special thanks to you for your good comments.

VERSION 2 – REVIEW

REVIEWER	Dinah Gould Cardiff University
REVIEW RETURNED	15-Jan-2019

GENERAL COMMENTS	This ms has been updated as required. It is a solid paper that adds to the infection prevention literature
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REVIEWER	Hong Bin Kim, M.D. Division of Infectious Diseases Seoul National University Bundang Hospital Department of Internal Medicine Seoul National University College of Medicine Republic of Korea
REVIEW RETURNED	27-Jan-2019

GENERAL COMMENTS	I think that the authors sincerely responded to reviewers' suggestions and reflected the opinions. However, I am still afraid there are unclear descriptions for respondents and subjects on survey questions. Authors clarified "family members or caregivers were enrolled to provide patients' demographic information, attitude and the HH care they have provided to patients (in line 29-32, page 6) according to my previous comment. But the titles of table 1 and table 2 are still unclear if the contents (answers) are for only patients or both patient and family members. According to the corrected sentence, the contents described in the table 1 and 2 seemed to be applicable to patients. (I also have doubts the knowledge and
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	<p>attitude of patients could be answered by other people, especially, considering family members answered in case of critically-ill or impaired conscious patients. Of course, I understand the possibility of inaccurate answers by family members has been already described as the 'limitations'.)</p> <p>Therefore, I suggest authors should clarify more in titles of tables as well as manuscripts who were subjects for the answers (patients? or survey's respondent?). In addition, I recommend the authors to submit the original survey documents (in English version) as supplementary materials which can help readers to understand well.</p>
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VERSION 2 – AUTHOR RESPONSE

Responds to the reviewer's comments:

Reviewer #2

Reviewer Name: Dinah Gould

Institution and Country: Cardiff University, Wales, UK

Please state any competing interests or state 'None declared': None

Response to comment: This ms has been updated as required. It is a solid paper that adds to the infection prevention literature.

Response: Dear professor Dinah Gould, thanks for your approval for our research.

Reviewer #3

Reviewer Name: Hong Bin Kim

Institution and Country: Professor , Department of Internal Medicine , Seoul National University College of Medicine, Division of Infectious Diseases , Seoul National University Bundang Hospital , Republic of Korea

Please state any competing interests or state 'None declared': None declared

Response to comment: I think that the authors sincerely responded to reviewers' suggestions and reflected the opinions.

However, I am still afraid there are unclear descriptions for respondents and subjects on survey questions. Authors clarified "family members or caregivers were enrolled to provide patients' demographic information, attitude and the HH care they have provided to patients (in line 29-32, page 6) according to my previous comment. But the titles of table 1 and table 2 are still unclear if the contents (answers) are for only patients or both patient and family members. According to the corrected sentence, the contents described in the table 1 and 2 seemed to be applicable to patients. (I also have doubts the knowledge and attitude of patients could be answered by other people, especially, considering family members answered in case of critically-ill or impaired conscious patients. Of course, I understand the possibility of inaccurate answers by family members has been already described as the 'limitations'.)

Therefore, I suggest authors should clarify more in titles of tables as well as manuscripts who were subjects for the answers (patients? or survey's respondent?). In addition, I recommend the authors to submit the original survey documents (in English version) as supplementary materials which can help readers to understand well.

Response: Thanks for your comments. We are very sorry for the unclear description of the subjects in this study. As described in 'Introduction' section in page 4 last line, the purpose of this study was to investigate 'inpatient' knowledge, as well as the attitudes towards and practice of PHH during hospital stay, so the subjects were inpatients, while the respondents including patients and family members or caregivers. We corrected the description in manuscript in page 6 line 10-11 as 'Family members or caregivers were enrolled to represent patients to provide patients' demographic information, attitude and the HH care they have provided to patients in the case of patients with impaired consciousness, who were critically ill, or who were under the age of 14 years'. We also revised the titles of Table 1 and Table 2 as 'Table 1 Demographic characteristics of the 310 included patients.' in page 24 line 1 and 'Table 2 Performance of hand hygiene and knowledge and attitudes among the 310 included patients.' in page 26 line 1, respectively. To clarify more, we revised the description of 'Identity' in Table 1 in page 24 line 3 as 'Identity of the respondents'. Please check, thank you.

In addition, dear professor Hong Bin Kim, you recommended us to submit the original survey documents as supplementary materials which can help readers to understand well. However, as editors request, there do not need the copies of the original survey documents, because if accepted, the article will be published under an open access licence and therefore it may not be appropriate to include these as supplementary files. Please accept my apology for cannot submit the original survey documents and hope that the subjects was clarified clearly in tables and manuscript this time. Thank you.

Special thanks to you for your good comments.