

The Accuracy of the Patient Health Questionnaire–2 among Persons in Assisted Living

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Abstract

The objective of the current study is to test the reliability of the Patient Health Questionnaire - 2 (PHQ-2) in detecting depression in the assisted living setting. Twenty-five assisted living residents were interviewed using the Geriatric Depression Scale (GDS-15) and PHQ-2 for depression. The two tools had a weak correlation of $r(23)=0.4082$. The PHQ-2 had a specificity of 1.0 and a sensitivity of 0.20, showing that the PHQ-2 did not identify all cases of depression in the sample. This study shows that the PHQ-2 is not reliable for testing depression in the assisted living setting.

The Accuracy of the Patient Health Questionnaire – 2 among Persons in Assisted Living

Introduction and Purpose

Depression can be a problem in older adult populations. Compared to younger adults, older adults are less likely to develop major depressive disorder, but depression in general is one of the most common disorders in the older adult population. Kurlowicz and Harvath (2008) in discussing depression say that, “despite its prevalence, associated negative outcomes, and good treatment response, depression in older adults is highly under-recognized, misdiagnosed, and subsequently under-treated” (p. 61). Even though many older adults do not have major depressive disorders, there are a large number with depressive symptoms. Older adults with depressive symptoms range from 3-26% of those in the community and 16-30% of those living in nursing homes (Kurlowicz & Harvath, 2008). Even those with depressive symptoms or minor depression deserve treatment.

Some predictors of depression in older adults are health problems, lack of psychosocial resources, a poor attitude of aging, and lack of religiosity (Jang, Bergman, Schonfeld, & Molinari, 2006). Considering that the population in the current study will be assisted living, some of these problems may apply. For example, if an older adult is living in an assisted living home, it is likely that he has a physical ailment which interferes with activities of daily living. Such a person might have dementia, forgetfulness, or be unable to care for himself. Another factor that affects depression is socioeconomic status. In a study by Raccio-Robak, McErlean, Fabacher, Milano, and Verdile (2002), depressed elders often made little money and had chronic illnesses, which likely cost them a good deal of money. These elders were unable to perform their

activities of daily living, “and were more likely to live in an assisted living situation” (Raccio-Robak et al., 2002, p. 72).

In a study by Watson, Garrett, Sloane, Gruber-Baldini, and Zimmerman (2003), 2,078 assisted living residents were screened for depression using the Cornell Scale for Depression. Of these residents 13% were depressed, but only 18% of those who were depressed were receiving medications for depression. Another depression study with assisted living residents also used the Cornell Scale for Depression (Watson et al., 2005). In this study of 196 residents, 24% were found to be depressed, but only 43% of the depressed residents were taking medication for depression. As one can see in these cases, depression can be under-detected and under-treated.

According to Lach & Smith (2007), there are many different tools that can be used for the detection of depression. The Geriatric Depression Scale (GDS) is a well known and reliable tool (Brink et al., 1982). There are several versions of the GDS, including 30, 15, and 5 question versions. All have been found to have high levels of specificity and sensitivity. Another tool is the Beck Depression Inventory, which contains 13 items that are ranked on a four-point scale (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). There is also a 21-item form. Too, there is the Center for Epidemiological Studies Depression Scale which contains 20 items that are also ranked on a four-point scale (Radloff, 1977). It however, is more complex than some of the other tools, making it less realistic to use.

A study by Watson, Zimmerman, Cohen, and Dominik (2009), mentioned some other depression tools. They used the GDS-15 (Brink, Yesavage, Lum, Heersema, Adey, et al., 1982). They also used 1) the Minimum Data Set Depression Rating Scale, which is

a 7-item scale completed by the caregiver (Watson et al., 2009); 2) a One Item Screen, in which the caregiver answered whether or not he or she believed that the resident was depressed; and 3) the Two-Item Patient Health Questionnaire (PHQ-2), which obviously is made of 2 items (Spitzer, Kroenke, & Williams, 1999). They also used the Cornell Scale for Depression in Dementia. This scale is made of 19 questions, and as shown in its title, is effective in patients with dementia; however, it is also effective in patients who do not have dementia (Watson et. al., 2009). In addition to these tools, a psychiatric analysis was performed as well as a review of charts. Overall in the study, about “one quarter to one third of residents screened positive for depression on the caregiver and resident reported measures [and] clinician diagnoses yielded a 14% prevalence of major or minor depression, and increased to 22% when broadly considered as ‘would treat’” (Watson et. al., 2009, pp. 559-560). Amazingly, the test that worked the best in terms of sensitivity and specificity was the PHQ-2.

Because of these findings, the question may be asked, “Is the Two-Item Patient Health Questionnaire reliable in detecting depression in the assisted living population?” In order to test this question, the GDS-15 (Brink et al., 1982) and the PHQ-2 (Spitzer et al., 1999) will be compared, with the GDS-15 used as a criterion against which to validate the PHQ-2. Hopefully, since the tool is so brief and easy to give, it can be used more often in the future to detect depression early and begin effective treatment for residents.

Methods

Sample

In order to evaluate the effectiveness of the PHQ-2 (Spitzer et al., 1999), data were collected from assisted living residents. Twenty-five residents were evaluated from three different assisted living communities in Beaver County, Pennsylvania (See Table 1). The two criteria for inclusion in the study were residence in an assisted living home and age of 65 or older.

Sample Demographics			
Facility	Number of Males	Number of Females	Total
A	2	13	15
B	2	3	5
C	3	2	5
Total	7	18	25

Table 1

In order to obtain participants for the study, letters were sent out to the families of residents in the community (Appendix A). The letters were consent forms for the families to sign allowing their loved one to participate in the study. Approximately 260 letters were sent out to residents' families at all three facilities. If the families consented, they sent their form back to the assisted living facility where they were kept until the interviews began. Before interviewing participants, consent was sought verbally by the interviewer (Appendix B). If the participant agreed, the interview process then occurred and the participant was included in the study and results. Of all the families who consented (28 in total) one participant declined, and two were cognitively unable to answer the questions.

Measures

The Geriatric Depression Scale- 15 (Brink et al., 1982) (Appendix C) was the first tool given to participants. Because of the GDS-15's validity and known acceptance in being reliable in detecting depression, it was used as a criterion marker for the participant's depression level. One study by Aikman and Oehlert (2000) named three other studies that all validated the use of the GDS-15. The study itself indicated that the GDS-15 is valid as a substitute for the long form of the GDS, which has 30 questions. A study by Watson, Zimmerman, Cohen, and Dominik (2009) also found the GDS-15 to be effective in identifying depression. According to their study, the GDS-15 had a specificity of 0.75 and a sensitivity of 0.6 (Watson et al., 2009).

The Patient Health Questionnaire (Spitzer, Kroenke, & Williams, 1999) (Appendix D) was also found to have appropriate sensitivity and specificity. In the same study by Watson et al. (2009) the PHQ-2 had a sensitivity of 0.80 and a specificity of 0.71 (p. 561). These statistics led to the current study. The PHQ-2 was taken from the previous PHQ which contained three pages of questions about mental health. There is also a 9 question version of the PHQ. (Kroenke, Spitzer, & Williams, 2001). The PHQ-2 has been found to be an accurate and reliable tool in assessing depression both in primary care and in home health care to elders who are homebound (Sheeran, Reilly, Weinberger, Bruce, & Pomerantz, 2010). The PHQ-2 had a sensitivity of 87% and a specificity of 78% from previous studies (Sheeran et al., 2010, p.100). Similarly, a study by Li, Friedman, Conwell, and Fiscella (2007) indicated that the PHQ-2 was reliable and valid in testing for major depression among elderly persons. They reported that the specificity of the PHQ-2 was 77% with sensitivity of 100%. Because this tool is effective in

homecare and among the elderly population, the current study will measure its effectiveness in the assisted living setting.

Procedure

After proper consent was achieved as mentioned above, the tools were administered. In each case, the GDS-15 (Brink et al., 1982) was administered first, followed by the PHQ-2 (Spitzer, 1999). The tools were read and completed by the researcher based on the participants' answers. After the depression measures were delivered, the participants were verbally given a debriefing statement explaining the purpose of the study (Appendix E). They were asked if they had questions and were encouraged to talk to the researcher or nurse at the home if they experienced any distress or had further questions at a later time. They were thanked and received a small bottle of lotion for their time and participation. After the interviews were over, the tools were tallied, and anyone receiving a score of six or greater on the GDS-15 was reported to the nurse or director of the home for further evaluation.

Analysis and Results

After all the interviews were completed and the tools tallied, all the data were put into a table on Microsoft Excel. A Pearson Correlation was calculated to compare GDS-15 (Brink et al., 1982) and PHQ-2 (Spitzer et al., 1999) scores. The correlation coefficient was $r(23) = 0.4082$, (Polit & Beck, 2010) indicating that the two tools are not very comparable. The next step was to make a chart based on the number of true and false positives and true and false negatives. In total, there was one true positive in which both tools identified depression. There were 20 true negatives, in which both tools did not identify depression. In 21 cases, the PHQ-2 matched the GDS-15 perfectly. However, in

four cases, the PHQ-2 gave a false negative and did not identify the depression that the GDS-15 did. There were no false positives on the PHQ-2 (See Table 2 & Figure 1).

From this, sensitivity and specificity scores were calculated based on a sensitivity and specificity equation in *Essentials of Nursing Research* (Polit & Beck, 2010, p. 381). The PHQ-2 (Spitzer et al., 1999) sensitivity score is 0.2 which is quite weak. Sensitivity shows the tool’s ability to correctly measure a value. The specificity was 1.0, which is strong. Specificity is the tool’s ability to “screen out those without the condition” (Polit & Beck, 2010, p. 381). Thus, the PHQ-2 was successful at identifying when depression was not present, but it showed fallibility in identifying depression.

Sensitivity/Specificity of the PHQ-2	
Result of Test	Number of Tests
True Positive	1
True Negative	20
False Positive	0
False Negative	4

Table 2

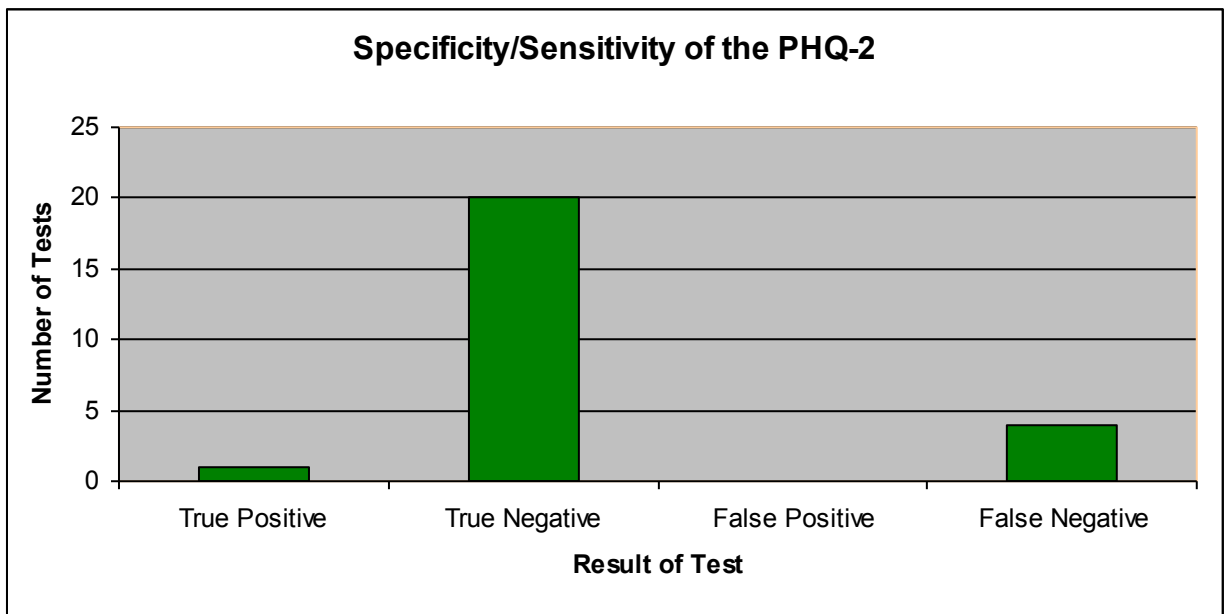


Fig. 1

Discussion

The purpose of this study was to see if the PHQ-2 (Spitzer et al., 1999) was effective in detecting depression among elders in assisted living. The hope was that if it was accurate and sensitive that it could be used, instead of the GDS-15 (Brink et al., 1982). However, this study does not support the use of the PHQ-2 in place of the GDS-15 in the assisted living population. While the PHQ-2 was very specific in this population, it was not sensitive, missing 4 cases of depression out of 25.

Emerging Themes

There were several different themes that emerged through the administration of the questionnaires. The first theme was the physicality of the GDS-15 (Brink et al., 1982). Questions like “Do you feel full of energy?” (GDS 13), “Do you often feel helpless?” (GDS 8), and “Have you dropped many of your activities and interests?” (GDS 2) can be taken physically. The typical assisted living resident is elderly and is at the facility for a physical or mental disability – needing some degree of assistance. Because of this, some of the participants answered these questions with responses such as, “I had to drop my activities since coming here,” “I feel helpless because of my stroke,” “Yes, I feel helpless because I cannot walk,” and “I once felt full of energy.” Another participant mentioned that she was not basically satisfied with her life (GDS 1) because of mobility issues and that she felt useless because she could not get around as easily as earlier in life. Yet, while this same participant felt hopeless about her physical body, she did not feel like her life was empty (GDS 3) because of her family and grandchildren. It appears that the PHQ-2 (Spitzer et al., 1999) deals more with emotions and less with physical manifestations of depression. It does not deal with whether or not a

person can physically pursue his interests. The question “Over the past 2 weeks, how often have you felt down, depressed or hopeless” (PHQ 2) could possibly be affected by how one’s perception of the physical self affects that individual, but it is not a physical question. However, a decrease in mobility was not always a reason for depression. For example, one participant said that he was not able to walk well, but uses a walker, so he did not feel helpless (GDS 8). In total, seven participants mentioned their mobility or physicality during the administration of questionnaires.

Another theme that emerged was whether a participant enjoyed his or her current living situation. Six participants stated “I like living here” or a statement very similar. None of those six participants tested positive for depression on either scale. Participants also mentioned “I don’t get bored here” (GDS 4), “I have added on to my activities” (GDS 2), “I like my life” (GDS 15), “I like it here because they take us out” (GDS 9), and “There are things to do – Bingo” (GDS 4). It appears that when people are involved in what the facilities offer, they have lower rates of depression. Whether the link is causal remains to be shown. In addition, the six participants mentioned all answered that they were satisfied with life (GDS 1), were happy (GDS 5), were in good spirits (GDS 7), did not feel helpless (GDS 8), felt that it was wonderful to be alive (GDS 11), did not feel worthless (GDS 12), and did not feel hopeless (GDS 14) (Brink et al., 1982). The PHQ-2 (Spitzer et al., 1999) picked up that these participants were not depressed. Notably, in response to the questions posed by the PHQ-2, one participant mentioned that “I knew what I was getting into coming here. I really like it here.” The PHQ-2 does address this idea. It addresses the participants’ interest in things (PHQ 1) which shows how they feel about their lives and further their living conditions.

Limitations

One of the limitations of this study was the small sample size. A second limitation was the order in which the tools were given. In each case the GDS-15 (Brink et al., 1982) was administered first followed by the PHQ-2 (Spitzer et al., 1999). Because the order was never reversed, the order could have contributed to the effects observed here. Polit and Beck (2010) explain that crossover design decreases the chances that results are due to the first treatment affecting the second treatment. In this case, the GDS-15 might have influenced how the participant felt about the PHQ-2. Using a crossover type design would have ruled out this possibility.

Another limitation was that cognitive functioning was not measured prior to the administration of the questionnaires. A study by Holtzer et al. (2005) claimed that symptoms of depression are prevalent in Alzheimer's disease, and that they are more prevalent early on in the disease process (p. 2087). It is possible that some of the participants may have had a mild form of dementia or Alzheimer's disease. Further, some of the depression observed in this study could have been secondary to dementia, or simply dementia and not depression.

More importantly, weak cognitive functioning can affect the accuracy of the depression tools, specifically the GDS-15 (Brink et al., 1982). A study by Debruyne et al. (2009) found that the GDS-30 is not reliable in screening for depression in patients with Alzheimer's disease, but is reliable in finding depression in patients with mild cognitive impairment. Debruyne et al. define mild cognitive impairment (MCI) according to a prior study by Peterson (2004), who describes the term as a transitional zone from forgetfulness of normal aging to the development of Alzheimer's disease in its early

stages. Subjects from the study by Debruynne et al. (2009) were staged for cognitive functioning using the Mini-Mental Status Examination (MMSE; Folstein et al., 1975). Through their MMSE scores, the participants were divided into those with mild (>17), moderate (10-17), and severe (<10) Alzheimer's disease. Neither Debruynne et al., nor Peterson named a MMSE score for MCI, but a score of 23 or lower is generally thought to show impairment of cognition (Kurlowicz & Wallace, 1999). It can be assumed that MCI would appear on the MMSE scale around this imperative score of 23 as a transition to dementia. The mean score of the MCI group in the study by Debruynne et al. (2009) was 25.8 ± 3.1 , and the participants had scores ranging from 17 to 30 on the MMSE.

In the present study, all of the participants were able to carry on a conversation with the researcher and were able to answer the questions provided to them. Residents living in an Alzheimer's unit were excluded from the study. However, as the study by Debruynne et al. shows, some participants with MCI, might have had normal MMSE scores (mean = 25.8 ± 3.1) and were still effectively assessed for depression with the GDS-15 (Brink et al., 1982). So, even if MMSE was assessed prior to the administration of the two depression tools in the current study, participants who had a normal MMSE score may have been in that transitional stage between forgetfulness of normal aging and the early stages of Alzheimer's disease. It is difficult to perfectly categorize this group. It is understood that the GDS-30 was used in Debruynne et al.'s study, and that the GDS-15 was used in the current study. However, as mentioned in the methods section of this article, the GDS-15 was found to be reliable in the place of the GDS-30. It can also be argued that it may have been difficult to find a large sample in the assisted living setting of people with normal MMSE scores considering that most people in assisted living have

some sort of physical ailment or other problem that requires living in a facility with 24-hour care.

General Remarks

One of the hopes for the PHQ-2 was that in being so short and concise, it would be easy for nurses in the assisted living setting to use for more regular assessment of depression (Spitzer et al., 1999). However, the PHQ-2 proved somewhat difficult for participants to use in the current study, because they had trouble deciding how many days they felt hopeless, depressed, or had little interest in things. In the present study, the researcher read the questions to the participant and explained how to answer them using “Not at all,” “A few of the days,” “More than half of the days,” or “Nearly every day.” Perhaps, if the participant were able to see the chart of the PHQ-2, he or she would be better able to respond and understand the questions. Perhaps a dichotomous response scale would be useful. In general, it is much easier to answer yes or no to questions, than to give a specified number of days.

Also, in total, five participants out of 25 in the assisted living setting were found to be depressed in the current study. This is equal to 20% of the sample. These findings are similar to recent studies that were mentioned in the introduction of this article. So, this study does support that depression is a problem in the assisted living setting, and that more research needs to be done.

Implications for Further Research

It may be useful to further continue the current study, but to correct its limitations. For example, the sample could be significantly larger, the tools could be given in different orders, and cognitive status could be measured prior to participation in the

study. This would definitely improve the findings, making it tighter and more accurate. These limitations may have skewed the data, and the PHQ-2 (Spitzer et al., 1999) may actually be more sensitive than found in the current study. Another interest may be to give the participants an enlarged copy of the PHQ-2, and to have them circle which number best describes how many days they have felt depressed or uninterested. This may help them to better understand the PHQ-2 and the questions being asked. An additional interest may be to test the PHQ-9 with this population to see if it better encompasses problems in assisted living.

Conclusions and Implications for Nursing

In summary, this study found that the PHQ-2 was not reliable in testing for depression in the assisted living setting (Spitzer et al., 1999). The tool was found to be very specific, but not sensitive to when depression was present in an individual when compared to the GDS-15 as a criterion measure (Brink et al., 1982). It is recommended that nurses who work in assisted living facilities assess for depression in their residents regularly, because as shown depression was prevalent in 20% of the sample. If nurses are compliant with using the GDS-15 in assessing depression, more cases will be found and receive treatment. With further research, hopefully a tool can be found to be even more efficient and accurate than the GDS-15, which can help identify depression and reduce overall rates.

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Appendix A

April 4, 2010

Dear Family Member;

Hello; my name is Kiera Holbein and I am a junior nursing student at Malone University in Canton, Ohio. I am conducting a research project for my schooling about geriatric depression in the assisted living setting. For the study, I will be administering several depression tools in order to see which one is the most accurate in detecting depression. In several studies performed, depression is prevalent in 10-30% of elders, and usually under half of those with depression are actually being treated. My hope for the study is that one of the depression tools will yield a high level of accuracy and perhaps can be used more often in testing for depression so that more elders can be effectively treated and live better quality lives.

You have received this letter because your friend/loved one is currently a resident at Beaver Meadows Assisted Living. In this project, I am asking for your permission to work with your loved one. I will be meeting with the participants one day, to simply give them the two questionnaires. I have discussed the project with Joyce Ledford, RN, and she is aware of the study.

Please know that I am bound by law to keep all personal information about you and your loved one completely confidential. Also, know that you are permitted to withdraw your consent at any time during this study. Any report about this project will be made as a report of overall data, and no individual participant names or personal information are given in these reports. Also, if the participant expresses a wish to stop and/or decline a session, I will stop the session to prevent coercion of the individual to participate.

If you are willing to have your loved one participate in this study please sign the statement below and send it back to Beaver Meadows. Also, if you should have any questions, feel free to contact my advisor and nursing professor Karen Distelhorst, MSN at 330.471.8458.

Thank you so much for your consideration to help me with my project;
Kiera Holbein

Consent Statement:

I agree that my _____, named _____ may participate in the program described on this page.

_____ Signee _____ Date

Appendix B

A sample consent statement was as such:

“Hello Mr./Mrs./Ms. _____; my name is Kiera & I am a nursing student at Malone University in Canton Ohio. I am studying the views and feelings of adults, and am wondering whether you would be willing to answer a few of my questions about the quality of your life. You would be free to stop at any time. Would you be willing to talk with me for a few minutes about your life?”

Appendix C

Geriatric Depression Scale: Short Form

Choose the best answer for how you have felt over the past week:

1. Are you basically satisfied with your life? YES / **NO**
2. Have you dropped many of your activities and interests? **YES** / NO
3. Do you feel that your life is empty? **YES** / NO
4. Do you often get bored? **YES** / NO
5. Are you in good spirits most of the time? YES / **NO**
6. Are you afraid that something bad is going to happen to you? **YES** / NO
7. Do you feel happy most of the time? YES / **NO**
8. Do you often feel helpless? **YES** / NO
9. Do you prefer to stay at home, rather than going out and doing new things? **YES** / NO
10. Do you feel you have more problems with memory than most? **YES** / NO
11. Do you think it is wonderful to be alive now? YES / **NO**
12. Do you feel pretty worthless the way you are now? **YES** / NO
13. Do you feel full of energy? YES / **NO**
14. Do you feel that your situation is hopeless? **YES** / NO
15. Do you think that most people are better off than you are? **YES** / NO

Answers in bold indicate depression. Score 1 point for each bolded answer.

A score > 5 points is suggestive of depression.

A score greater than or equal to 10 points is almost always indicative of depression.

A score > 5 points should warrant a follow-up comprehensive assessment

Appendix D

Patient Health Questionnaire – 2 Item Form

Over the past 2 weeks, how often have you been bothered by any of the following problems?	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3

Appendix E

Debriefing statement:

“Thank you so much for completing these two questionnaires. The purpose of this study was to see if the short questionnaire called the Patient Health Questionnaire was accurate in assessing the feelings of adults. If you experienced any distress during these questionnaires, please let me know or the nurse. I am very thankful for all of your help. Do you have any questions?”