

Women awareness of controllable risk of dementia in Riyadh, Saudi Arabia

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Abstract: A large number of existing studies in the broader literature have speculated on the role of gender in the incidence of dementia. Most of these studies tend to suggest that women have an increased risk of dementia when matched with men. The objective of the study was to evaluate awareness of controllable risk of dementia among women such as social enhancement, cognitive training, tobacco cessation, avoid alcohol consumption, increasing physical activity, management of overweight, hypertension, high lipids, diabetes, depression and provision of hearing aids to elderly after screening. The study sample consisted of female health care providers (n=31), college teaching staff (n=19), and students (n= 34) in Riyadh, Saudi Arabia. The study sample was sent a quiz between May and June 2020, through Whatsapp and email, and participation made entirely voluntary. The findings showed that the level of awareness increased with an increase in age. A positive correlation was observed between age and the level of awareness. The study findings also showed that healthcare providers had outstandingly high level of awareness on the controllable risk of dementia compared to college students. Based on these findings, the study recommends efforts that can increase awareness on the controllable risk of dementia, through campaigns or educational courses.

Keywords: Awareness, dementia, memory loss, women, young-onset, Saudi Arabia.

INTRODUCTION

Dementia, according to the World Health Organization, is a syndrome of either chronic or progressive nature that leads to the deterioration in mental functions. The deterioration in cognitive function often affects the ability of an individual to process thought beyond expectations from normal ageing. Put another way, dementia affects memory, thinking, understanding, orientation, the ability to learn, judgement, language and the ability of one to calculate. In many cases, dementia develops from a number of diseases and injuries that affect the brain, key among them being stroke or Alzheimer's disease (World Health Organization, 2019).

Age is the best-known risk factor for dementia. The risk of an individual developing Alzheimer's disease or vascular dementia increases almost twice every five years once one is at age 65. Recent estimates show that dementia affects at least one in 14 people above 65 years and at least one in six individuals above 80 years of age. Some of the factors that can contribute to accelerated ageing may include higher blood pressure, a higher risk of cardiovascular disease, changes to the nerve cells, the structure of the cell and DNA, loss of sex hormones, the failure of the natural repair system in the body and changes in an individual's immune system. Apart from ageing, genetics, medical conditions and lifestyle choices can also increase the risk for dementia (Alzheimer's Society, 2020a). Stated otherwise, an individual's risk of developing dementia relies on all the risk factors put together.

However, this does not mean that dementia only affects older people. A case in example would be young-onset dementia, which accounts for close to 9% of the cases as reported by the World Health Organization (2019). Young-onset dementia (YOD) refers to the start of the symptoms of dementia before one reaches the age of 65 (World Health Organization, 2019; Alzheimer's Society, 2020a; Wong *et al.*, 2020). Because of the age factor, it is important to get a dementia diagnosis early enough.

Undeniably, it can be difficult for younger people to undergo timely diagnosis for this syndrome. Many factors contribute to this challenge. First, as seen earlier, young-onset dementia happens infrequently and affects only close to 9% of the population (World Health Organization, 2019). What this means is that many practitioners in the healthcare sector may not have the prerequisite experience to associate younger adults with the symptoms of dementia. Second, the signs of young-onset dementia may also be difficult to detect. Also, the detection of YOD may come down to other aspects such as relationship issues, difficulties at work, stress, or even menopause. As a final point, the early symptoms of YOD are less likely to be associated with loss of memory and more prone to reflect in terms of behavior change, language, personality, and difficulties in sight. More often than not, younger individuals with dementia are likely to set aside initial and mild symptoms or attribute them to other causes (Alzheimer's Society, 2020b). This can also mean missing the support required for those diagnosed with dementia.

A large number of studies in the broader literature indicate that the approach of being assessed and receiving

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a dementia diagnosis can be long and intimidating. In particular, this is true where young individuals are involved. However, a common agreement from past literature is that the core of the assessment process must involve taking an elaborate history of the symptoms experienced by an individual, any variations experienced, as well as the impact of daily activities (O'Malley *et al.*, 2019a; O'Malley *et al.*, 2019b). For instance, a recent study sought to find ways to improve diagnostic processes and find suitable ways to teach professionals some of the key issues affecting YOD (O'Malley *et al.*, 2019a). Articles were searched from bibliographic databases to identify some of the self-reported experiences of YOD diagnosis. The outcome of the review identified some of the reasons for delayed diagnosis in YOD (O'Malley *et al.*, 2019a). One of those reasons was setbacks in gaining access to help, while the other reason was due to clinicians misattributing the symptoms. The findings of the review imply that it is necessary to enhance the identification of presenting symptoms and reduce errors resulting from diagnosis of younger adults to encourage future engagement (O'Malley *et al.*, 2019a). Another review in the same domain appraised current evidence concerning the best practices in diagnosing dense presentations of YOD (O'Malley *et al.*, 2019b). A detailed search of literature was carried out on some of the key elements of YOD diagnosis. The outcome of the study demonstrated that there is need for a clinically demanding and methodical approach to minimize mis or underdiagnosis of younger individuals (O'Malley *et al.*, 2019b). What is evident from these findings is that there is need for a detailed approach to assess YOD.

A large number of existing studies in the broader literature have speculated on the role of gender in the incidence of dementia. Most of these studies tend to suggest that women have an increased risk of dementia when matched with men. However, there have been concerns that most of the studies that make this claim often use limited sets of data. Based on this limitation, an earlier study examined the role of gender differences in the prevalence of dementia, Alzheimer's disease, as well as vascular dementia using a large population based prospective cohort. The study findings showed that the incidence of dementia was the same for both genders on the general scale. However, the incidence declined only for men after about 90 years, and the decrease was particularly related to Alzheimer's disease (Rutenberg *et al.*, 2001). The study also revealed that men experienced a higher incidence rate of vascular dementia compared to women. These findings imply that there are no gender differences in the prevalence of dementia until a certain high age.

The role of gender on the incidence of dementia has also been linked with cardiovascular risk. According to a recent report, there are a number of cardiovascular

disorders that are well-known to contribute to the risk of dementia, including atrial fibrillation, coronary artery disease among others. A majority of the cardiovascular diseases affect men more than women, including coronary artery disease, atrial fibrillation, myocardial infarction, and heart failure. Unlike the others, hypertension has higher prevalence in women than men. High blood pressure is a popular risk factor for cerebrovascular disorders, such as stroke, cerebral infarct, as well as dementia. However, it is still not clear whether high blood pressure is an independent risk factor for dementia (Kim *et al.*, 2018). While many studies tend to theorize the link between high blood pressure and dementia, some have failed to prove this relationship.

Information provided by the Alzheimer's Society shows that dementia occurs differently for women. On a global scale, the ratio of women to men who end up with dementia is estimated to be 2:1. Data extracted from brain scans reveals that most women have their brain cells dying faster compared to men. Besides, women are more likely to live longer compared to men. The age factor, together with brain diseases can contribute to the high rate of dementia among women (Alzheimer's Society, 2020c).

A series of recent studies has indicated that estrogen has a potential role of influencing the pathobiology as well as preventing the prevalence of Alzheimer's disease. This hypothesis was tested in a recent review study, which presented hormone therapy as a potential catalyst for preventing Alzheimer's disease among women. Apart from the Women's Health Initiative and the Women's Health Initiative Memory Study, the review noted that most of the research supported a useful effect of estrogen on cognition and consequent prevention of Alzheimer's disease (Wharton *et al.*, 2009). Even though the findings of the review article are contentious, cumulative evidence tends to suggest that estrogen has potential benefits to prevent Alzheimer's disease during perimenopause.

A number of studies have also recognized the link between lifestyle and brain health. A recent study focused on awareness and risk perception of dementia attended to examine this relationship. The study hypothesized that lifestyle factors, such as mental activity, physical exercise, and (non) smoking contributed to the risk of dementia in some way. However, most people do not understand the relationship between these two factors. As such, the research by Heger *et al.*, (2019) sought to examine dementia literacy as well as knowledge of the adaptable risk and protective factors of dementia in a Dutch sample. The study used the British Social Attitudes survey to examine dementia awareness and knowledge about risk and protective factors. The outcome of the study revealed that most of the participants were unacquainted with the relationship between lifestyle and the risk of dementia. A majority of the participants

recognized limited cognitive activity, consumption of an unfit diet, and physical inactivity as risk factors for dementia. However, there were gaps in knowledge concerning the role of other risk factors, such as hypercholesterolemia, hypertension, as well as coronary heart disease (Heger *et al.*, 2019). These findings demonstrated the significance of increasing awareness in the general population concerning the presence of adaptable dementia risk factors.

Another recent study also focused on awareness of dementia among a population of different backgrounds and experience. The focus of the study was primarily on Alzheimer's disease. The outcome of the study showed that general knowledge on Alzheimer's disease was fair. However, there were a lot of variabilities across different groups. The highest knowledge of the disease was reported among professionals working in the dementia field, lowest knowledge was reported among dementia caregivers and older adults, and the least knowledge was among undergraduate students and senior center staff. Across all the groups, the respondents had adequate information on the evaluation, treatment, and management of Alzheimer's Disease. Least information was also reported regarding the risk factors and prevention strategies for Alzheimer's disease (Carpenter *et al.*, 2011). The scholarly work recommends identifying gaps in dementia and developing learning initiatives to promote disease awareness and enhance supportive services.

Modifiable risk factors can be used to determine the causes of dementia in at least one third of the cases. Because of this, recent research has led to the development of the "Lifestyle for Brain Health (LIBRA)" index meant to help measure the risk of dementia progression in an individual due to modifiable risk factors (Schiepers *et al.*, 2018; Franchini *et al.*, 2019; Vos *et al.*, 2017). One recent study examined LIBRA in the context of a large longitudinal population-based sample (Schiepers *et al.*, 2018). Data used in the study was drawn from the Maastricht Ageing study and included 949 participants with their age ranging between 50 and 81 years. The outcome of the study revealed that LIBRA projected the future risk of dementia and the possibility of cognitive deficiency. LIBRA managed to forecast the rate of decline in the participants' processing speed but was unable to do so for executive functioning or memory (Schiepers *et al.*, 2018). In another study, a sample of Italian elders was used to examine the link between LIBRA scores and the indicators of cognitive performance, psycho-behavioral symptoms, and functional independence. Among the participants with subjective cognitive decline, a significant link was noted between LIBRA and the indicators of deficiency in global cognition, semantic articulation, and visuo-spatial attention (Franchini *et al.*, 2019). These observations imply that the

LIBRA index might be significant in determining the lifestyle factors associated with a decline in cognition and psycho-behavior.

In the same manner, another recent study evaluated the ability of the LIBRA index to predict cases of dementia among individuals in the midlife, late life, and old people. The study computed the LIBRA index based on adjustable risk factors, including depression, hypertension, diabetes, hypercholesterolemia, physical activity, coronary heart disease, smoking, alcohol use, and obesity. The findings showed that the risk of dementia intensified with higher LIBRA scores among individuals in midlife and late life. The findings also showed that persons in the intermediate as well as the high-risk groups had an increased risk of dementia compared to those classified in the low-risk groups. Among the oldest-old, higher LIBRA scores did not increase the danger of dementia (Vos *et al.*, 2017). These findings imply that LIBRA might be useful in recognizing individuals at risk of dementia in the midlife and late life. However, the index may not be useful for incredibly old persons.

A number of previous studies have also emphasized the link between the start of cognitive impairment, dementia, and lifestyle-related risk factors. Specific lifestyle related factors identified to contribute to cognitive impairment and dementia include physical inactivity, use of tobacco, consumption of unhealthy diets, and toxic use of alcohol (World Health Organization, 2019; World Health Organization, 2020). Apart from lifestyle-factors, some medical conditions are associated with the enhanced risk of acquiring dementia. Some of the medical ailments include high blood pressure, obesity, diabetes, depression, and hypercholesterolemia. Studies have also identified potentially modifiable risk factors associated with dementia, key examples being mental inactivity and social isolation. These potentially modifiable risk factors suggest that it is possible to use a public health approach to prevent dementia (World Health Organization, 2020). As an example, a suitable public health approach would entail delaying or slowing down dementia or the process of cognitive decline.

Based on the scholarly contributions on dementia, the objective of the current study is to evaluate awareness of controllable risk of dementia among female health care providers, college teaching staff and students in Riyadh, Saudi Arabia.

MATERIALS AND METHODS

To meet the objective of the study, the study followed a quantitative approach. A quiz was adapted from the dementia fact sheet and the recommendations published by World Health Organization (2019; 2020). The fact sheet and recommendations contain questions of correct

statements measuring awareness. The link to the quiz was sent to study participants between May and June 2020, using the WhatsApp and email mediums. Participation to the study was completely voluntary, and study participants were only reminded once to take part in the study in an effort to increase the response rate. The study sample included female health care providers, college teaching staff, and students at Princess Nourah bint Abdulrahman University PNU. The study sample was distributed as follows: health care providers (n=31), college teaching staff (n=19), students (n=34).

Ethics approval

Bioethical principles of Institutional review board (IRB log number with KACST, KSA: 20-0199) have been obtained before the start of the study (May 2020) and considering the national regulations that govern the protection of human subjects.

STATISTICAL ANALYSIS

The data obtained were analyzed using the Statistical Package for Social Scientists SPSS software version 25, Chicago, IL, USA. Statistical significance was set as $p < 0.05$. For each of the following results, the name of the test applied were mentioned.

RESULTS

A total of eighty-two responses were received from the study participants. A summary of the findings is as shown below.

Effect of age, profession and awareness on identifying controllable risk of dementia

A three-way ANOVA was conducted to identify the main effects and interaction effects.

AGE

The homogeneity of variance assumption was met by the data, Levene statistic = .765, $p > 0.05$. Hence, the ANOVA results were considered as reliable. According to the ANOVA, age had a significant impact on the accuracy level, $F(3, 78) = 10.24$, $p < 0.05$. Tukey post-hoc test was conducted to identify which age group differ from which one. Results are shown in tables 1,2 and 3 in the appendices.

According to the post hoc test, people in 45-54 age group ($M=14.17$, $SD=5.15$) had significantly higher accuracy compared to people in 18-24 ($M=6.03$, $SD=4.36$) and 25-34 ($M = 9.29$, $SD=5.01$) age groups. Furthermore, people in 35-44 age group ($M=11.6$, $SD=5.45$) had significantly higher accuracy compare to those in the 18-24 age group. These statistics (illustrated in fig. 1 and table 4 in the appendices), clearly indicate that the level of awareness tends to increase with an increase in age. In other words, age has a positive relationship with awareness level.

Profession

The homogeneity of variance assumption was met by the data, Levene statistic = .232, $p > 0.05$. Hence, the ANOVA results were considered as reliable. According to the ANOVA test results, profession had a significant impact on the accuracy level, $F(3, 78) = 10.24$, $p < 0.05$. Tukey post-hoc test was conducted to identify which profession differ from which one. Results are shown in table 5, 6, and 7 in the appendices.

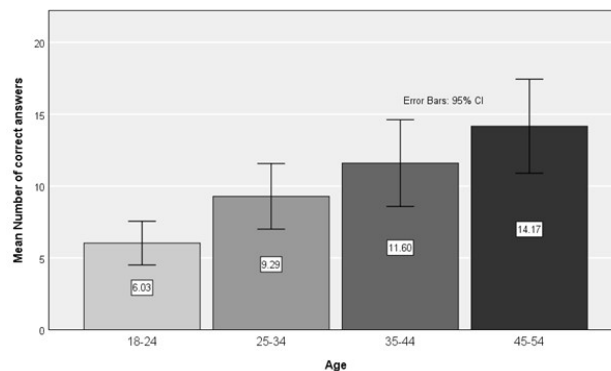


Fig. 1: Mean bar chart by age group

According to the post hoc test, there was only one difference where health care providers ($M=12.9$, $SD=5.16$) had significantly higher awareness level compared to college students ($M=5.63$, $SD=4.20$). These results are illustrated below in fig. 2 and table 8 in the appendices.

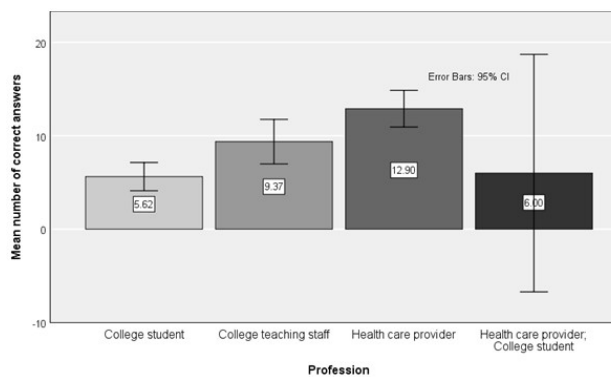


Fig. 2: Mean bar chart by profession

Awareness on identifying controllable risk of dementia

The homogeneity of variance assumption was met by the data, Levene statistic = 5.04, $p > 0.05$. Hence, the ANOVA results were considered as reliable. According to the ANOVA, awareness had no significant impact on the accuracy level, $F(1, 80) = .565$, $p < 0.05$. These results are as shown below in table 9 and 10 in the appendices.

DISCUSSION

The primary findings in this study ascertain that the level of awareness tends to increase with an increase in age. These findings are similar to recent findings by Heger *et*

Table 1: Homogeneity of variance

		Levene Statistic	df1	df2	Sig.
Number of correct answers	Based on Mean	.765	3	78	.517
	Based on Median	.419	3	78	.740
	Based on Median and with adjusted df	.419	3	64.379	.740
	Based on trimmed mean	.743	3	78	.530

Table 2: Descriptive statistics

Age group	N	Mean	Std. Deviation
18-24	34	6.03	4.359
25-34	21	9.29	5.011
35-44	15	11.60	5.448
45-54	12	14.17	5.149
Total	82	9.07	5.621

Table 3: One-way ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	723.038	3	241.013	10.236	.000
Within Groups	1836.523	78	23.545		
Total	2559.561	81			

Table 4: Tukey post-hoc test

	(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	18-24	25-34	-3.256	1.347	.082	-6.79	.28
		35-44	-5.571*	1.504	.002	-9.52	-1.62
		45-54	-8.137*	1.629	.000	-12.41	-3.86
	25-34	18-24	3.256	1.347	.082	-.28	6.79
		35-44	-2.314	1.640	.496	-6.62	1.99
		45-54	-4.881*	1.756	.034	-9.49	-.27
	35-44	18-24	5.571*	1.504	.002	1.62	9.52
		25-34	2.314	1.640	.496	-1.99	6.62
		45-54	-2.567	1.879	.524	-7.50	2.37
	45-54	18-24	8.137*	1.629	.000	3.86	12.41
		25-34	4.881*	1.756	.034	.27	9.49
		35-44	2.567	1.879	.524	-2.37	7.50

Table 5: Levene Statistic

		Levene Statistic	df1	df2	Sig.
Number of correct answers	Based on Mean	1.459	3	78	.232
	Based on Median	.951	3	78	.420
	Based on Median and with adjusted df	.951	3	55.93	.422
	Based on trimmed mean	1.374	3	78	.257

Table 6: Descriptive statistics

	N	Mean	Std. Deviation
College student	32	5.63	4.195
College teaching staff	19	9.37	4.946
Health care provider	29	12.90	5.164
Health care provider;College student	2	6.00	1.414
Total	82	9.07	5.621

Table 7: One-way ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	824.950	3	274.983	12.365	.000
Within Groups	1734.611	78	22.239		
Total	2559.561	81			

Table 8: Tukey post-hoc test

	(I) Profession	(J) Profession	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	College student	College teaching staff	-3.743*	1.366	.037	-7.33	-.16
		Health care provider	-7.272*	1.209	.000	-10.45	-4.10
		Health care provider; College student	-.375	3.437	1.000	-9.40	8.65
	College teaching staff	College student	3.743*	1.366	.037	.16	7.33
		Health care provider	-3.528	1.392	.062	-7.18	.13
		Health care provider; College student	3.368	3.506	.772	-5.83	12.57
	Health care provider	College student	7.272*	1.209	.000	4.10	10.45
		College teaching staff	3.528	1.392	.062	-.13	7.18
		Health care provider; College student	6.897	3.448	.197	-2.15	15.95
	Health care provider; College student	College student	.375	3.437	1.000	-8.65	9.40
		College teaching staff	-3.368	3.506	.772	-12.57	5.83
		Health care provider	-6.897	3.448	.197	-15.95	2.15

Table 9: Homogeneity test

		Levene Statistic	df1	df2	Sig.
Number of correct answers	Based on Mean	5.042	1	80	.027
	Based on Median	3.785	1	80	.055
	Based on Median and with adjusted df	3.785	1	72.906	.056
	Based on trimmed mean	5.038	1	80	.028

Table 10: One-way ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17.939	1	17.939	.565	.455
Within Groups	2541.622	80	31.770		
Total	2559.561	81			

al., (2019) which suggested that its study participants who were 40 and 75 years understood that limited cognitive activity, consumption of an unfit diet and physical inactivity were risk factors for dementia. Maybe, it would be imperative to promote the use of LIBRA scores among individuals in midlife and late life to promote dementia awareness as observed by Vos *et al.* (2017). However, it is necessary to be cautious with LIBRA scores since they may not work with incredibly old persons.

This study also found that healthcare providers had a high level of awareness on dementia compared to college students. These findings are similar to a past study that showed that the general knowledge of Alzheimer’s disease was highest among professionals working in the

dementia field, and least among undergraduate students and senior center staff (Carpenter *et al.*, 2011). Like the recommendations by Carpenter *et al.* (2011), this study recommends identifying gaps in dementia awareness and developing learning initiatives to promote an understanding of the disease and enhance the use of supportive services.

CONCLUSION

The study findings revealed that the level of awareness tends to increase with an increase in age. That means that age has a positive correlation with the level of awareness. It was clear from the study that healthcare providers had a remarkably high level of awareness compared to college

students. These findings imply that there is need to direct efforts to increasing awareness through avenues, such as campaigns and educational courses. These results suggest that efforts to raise awareness across channels, such as campaigns and training courses, need to be focused. The study is beneficial in increasing the awareness of women on how to identify controllable risk of dementia.

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APPENDIX

DATA FORM

Q1 Age:

Q2 Profession: College Student/College teaching staff/health care provider

Q3 Are aware of potential controllable risk factors for dementia?

Q4	Select correct statement/statements (key answer: all correct and should be selected)	Correct	Incorrect
1	Physical activity should be recommended to adults with normal cognition to reduce the risk of cognitive decline.		
2	Interventions for tobacco cessation should be offered to adults who use tobacco since they may reduce the risk of cognitive decline and dementia in addition to other health benefits.		
3	The Mediterranean-like diet may be recommended to adults with normal cognition and mild cognitive impairment to reduce the risk of cognitive decline and/or dementia.		
4	A healthy, balanced diet should be recommended to all adults based on WHO recommendations on healthy diet.		
5	Vitamins B and E, polyunsaturated fatty acids and multi-complex supplementation should not be recommended to reduce the risk of cognitive decline and/or dementia.		
6	Interventions aimed at reducing or ceasing hazardous and harmful drinking should be offered to adults with normal cognition and mild cognitive impairment to reduce the risk of cognitive decline and/or dementia in addition to other health benefits.		
7	Cognitive training may be offered to older adults with normal cognition and with mild cognitive impairment to reduce the risk of cognitive decline and/or dementia.		
8	There is insufficient evidence for social activity and reduction of risk of cognitive decline/dementia.		
9	Social participation and social support are strongly connected to good health and wellbeing throughout life and social inclusion should be supported over the life-course.		
10	Interventions for mid-life overweight and/or obesity may be offered to reduce the risk of cognitive decline and/or dementia.		
11	Management of hypertension should be offered to adults with hypertension according to existing WHO guidelines.		
12	Management of hypertension may be offered to adults with hypertension to reduce the risk of cognitive decline and/or dementia.		
13	The management of diabetes in the form of medications and/or lifestyle interventions should be offered to adults with diabetes according to existing WHO guidelines.		
14	The management of diabetes may be offered to adults with diabetes to reduce the risk of cognitive decline and/or dementia.		
15	Management of dyslipidaemia at mid-life may be offered to reduce the risk of cognitive decline and dementia.		
16	There is currently insufficient evidence to recommend the use of antidepressant medicines for reducing the risk of cognitive decline and/or dementia.		
17	The management of depression in the form of antidepressants and/or psychological interventions should be provided to adults with depression according to existing WHO mhGAP guidelines.		
18	There is insufficient evidence to recommend use of hearing aids to reduce the risk of cognitive decline and/or dementia.		
19	Screening followed by provision of hearing aids should be offered to older people for timely identification and management of hearing loss as recommended in the WHO ICOPE guidelines.		